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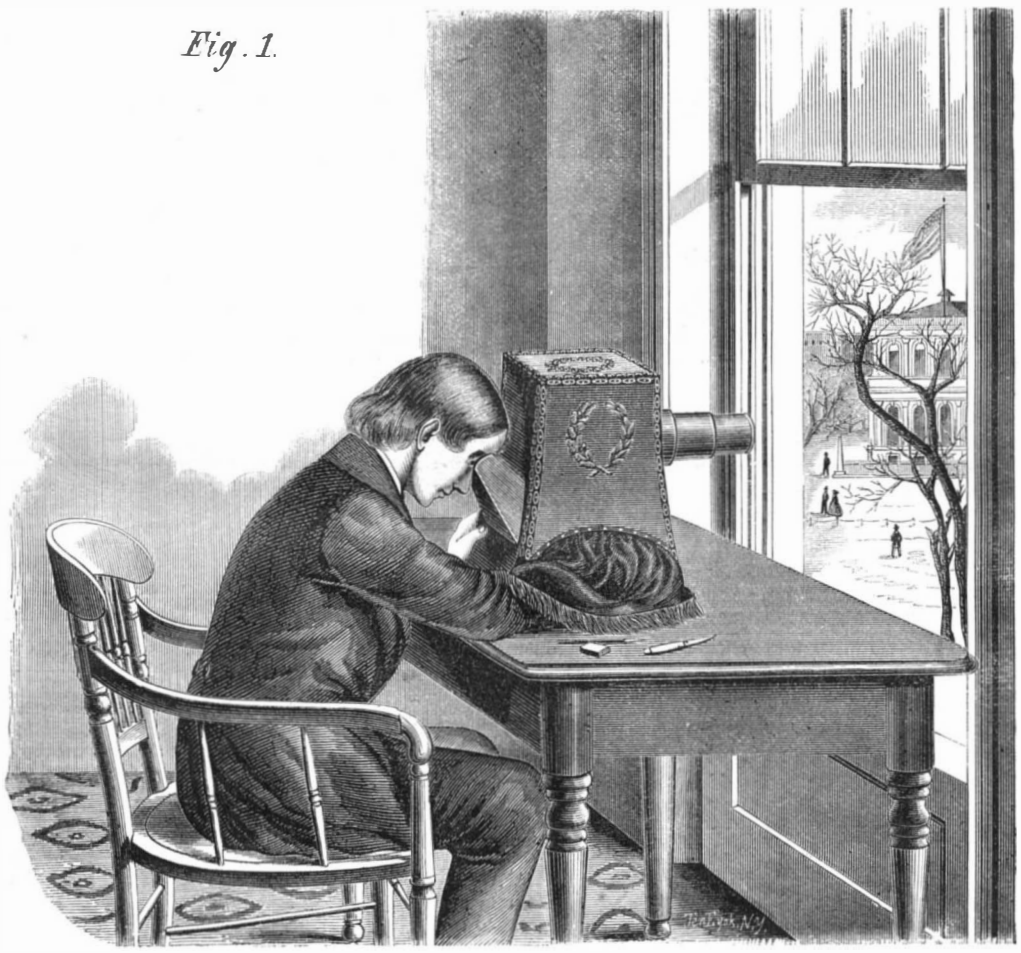
Improved Camera Obscura.

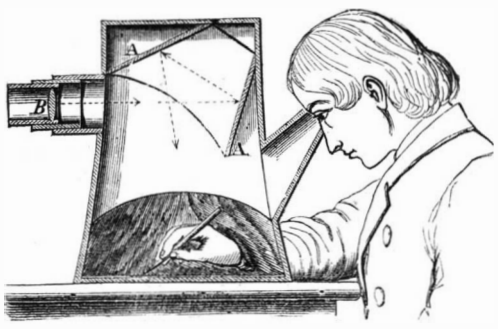
Nearly all persons possess in some degree a love for the fine arts; particularly those which relate to the reproduction, on canvas or paper, of the material matters of common life. The hills, rocks, and trees of nature hold some enchanted gazers, while others seek the gratification of their tastes in the animal kingdom, or in the illustrations of human nature in its various phases. A decided talent is one essential requisite to a good artist, but persons may become faithful limners without any inherent qualification whatever. In such instances the process is purely a mechanical one, and education must supply what nature has denied. A very valuable aid to artistic culture of the hand and eye is found in the "camera obscura," and the one herewith illustrated combines desirable qualities with an elegant exterior. The engraving explains itself, Fig. 1, is a perspective view of the case and the student engaged in depicting the City Hall of New York; this view gives a clear idea of the object of the invention. Fig. 2, is a section in which the internal arrangement of the mirrors, A, and the lens, B, are shown. The object to be depicted is reflected through the lens on to the mirrors in the manner shown by the arrows, and from them to the white paper or canvas below. The artist's hand is introduced through the side opening covered by the curtain, and the scenery is shown in all its natural colors and in the true light and shade belonging to it. Artists, amateurs, &c., will find this invention of great value in the prosecution of their studies. Lithographers, draftsmen, engineers, teachers, &c., will also find it a very useful and time-saving instrument. Patented on April 15, 1862, by G. F. Kolb, of No. 327 Chestnut street, Philadelphia, from whom all further information can be obtained.

Fig. 1.



KOLB'S PATENT CAMERA OBSCURA.

Fig. 2.



New Products and New Fields for Northern Labor.

It was stated recently that the people of Maine were about to tap the pine trees in that State with a view to making rosin, which they think can be done quite as well in that region as in the Carolinas. The object is worth the effort at least, and should it succeed, it will be a source of great profit to Maine, and also supply a want for which the North has been dependent on another and remote section of our country. A like fact of equal interest is, that the manufacture of tar has been commenced lately by the Norwegian settlers at Grand Traverse, Michigan, and we see it stated that the first consignment of fifteen barrels found ready sale at one dollar per gallon in the Chicago market. This is another Southern product with which the North may yet supply herself from her own resources. Thus the war that has interrupted our internal commerce, is having its compensations in directing the labor and enterprise of two sections of our country to new uses and in the development of certain material resources hitherto neglected on both sides.

ORIGIN OF THE GRAIN IN WHEAT.—The *grain*, which is common to the Troy and avoirdupois weights now used, has come down to us from olden times, and is mentioned in the "Magna Charta." It is described as "a grain of wheat gathered from the middle of the ear." This, of course, was exceedingly vague and arbitrary, but it sufficed for the simple wants of our ancestors; and since then its specific weight has been fixed on a firmer and more satisfactory basis.

Photographic Piracy of Engravings.

In relation to one of the varied applications of photography, a trial lately took place at one of the *Nisi Prisi* sittings in London, upon an action brought by Mr. Gambart, a well-known publisher of works of art. He purchases costly paintings and produces steel engravings of these, which he secures by copyright. He gave £5,506 ($27,500) for the painting of "The Savior in the the Temple," by Holman Hunt, which is the largest sum ever paid for a modern picture, and he had it engraved in the best style and charged ten guineas (fifty-two and a half dollars) for each printed copy. *Fac-similes* of his pictures had been taken by photographers and sold for prices varying from one to five shillings sterling each; and he sued a Mr. Mayne for damages in selling such copies, as being an infringement of his copyright. The charge was not proved and the jury gave a verdict for the defendant, but the justice on the bench stated that the plaintiff was actuated by praiseworthy motives as he had a very valuable property to protect.

Since photography has attained to such perfection *fac-similes* of superior engravings have been taken and sold in considerable numbers in London, thus injuring the sale of engravings which cost large sums of money to produce. A league has, therefore, been formed in that city by the publishers of engravings, for the purpose of putting down this practice of photographic piracy. In another case, where Mr. Gambart sued for an infringement of his copy-right of another picture called "The Light of the World," for which he paid 300 guineas to the engraver, he recovered £100 damages from a picture-frame maker who had sold several photographic copies of it. He also sued J. Bull for pirating his engraved copyright plate of Rosa Bonheur's celebrated painting called "The Horse Fair" and recovered £10 damages. This was a most important case, as a rule was obtained to set this verdict aside on the ground that the copyright Act did not contemplate their application to photographic copies of engravings. The trial was had in the Court of Common Pleas on May 2d, before Lord Chief Justice Erle and Justices Willes, Byles and Keating. The Chief Justice, in giving his decision, said that the statute applied to the copying—by any mode—of copyrighted prints; and whether a photograph was of the same size of the original picture or not, the statute was equally applicable.

AT a recent sale of autographs in Paris a piece of yellow paper was sold for 500 francs. It was a note written and signed by Martin Luther and dated

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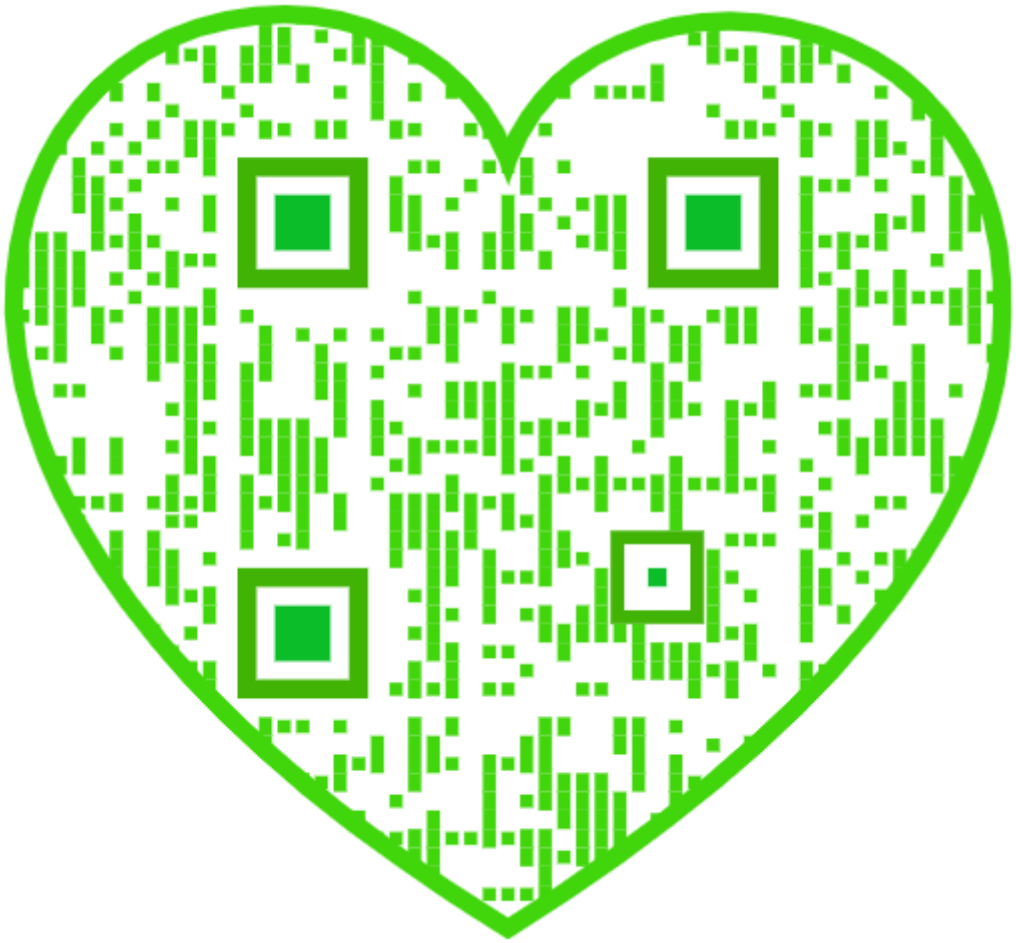

DISCOVERIES AND INVENTIONS ABROAD.

Preserving Timber.—A patent for a composition for preserving timber has been taken out by G. H. Birbeck, of London. It consists of sulphur and the oxides of iron, copper or zinc, mixed and boiled with the residue of the fat used in the manufacture of candles, and the product thus obtained is dissolved in American petroleum in a close vessel highly heated. The timber is prepared with this solution by boiling it in a covered iron tank or by forcing the solution into the pores of the timber with a pump—the timber being placed in a cylinder during the operation.

Improved Cement.—Common lime mortar becomes hard from long exposure to the atmosphere, by absorbing carbonic acid slowly, and thus returning to its original condition—limestone being a carbonate of lime. A patent has been taken out by C. W. Westmacott, of London, for a new cement to be used as mortar for building and plastering and also casting in molds. The nature of the improvement consists of a mixture of carbonate of lime with common burned lime. The cement is composed of 1 bushel of burned lime to 2 bushels of dry ground chalk or ground limestone or marble. The lime as it comes from the kiln is first slacked with water, then mixed with the ground chalk or limestone in water; sand is then added in the same way that common mortar is made, and the mass allowed to stand for two or three days before the cement is used. This cement may also be made by mixing the burned lime, dry, with the chalk (which is dried in an oven) in powder, and kept for use, to be mixed with water. It may also be worked into a paste and molded like clay. It soon becomes quite hard and fixed.

Welded Iron Cupolas and Forts.—The common method of constructing iron cupolas for revolving batteries is with iron plates bent by machinery, planed at the edges and afterwards fastened together with bolts. W. L. Tizard, of London, proposes to construct such cupolas—and has taken out a patent for the purpose—of welded plates, thus making them solid masses of iron. He proposes to bend the plates, and fit their edges together, then apply the intense heat derived from a stream of ignited oxygen and coal-gas, and having heated them to a welding temperature they are to be hammered by machinery. The gas for heating the metal is to be conveyed in flexible tubes and may be directed on any point so as to produce a perfect weld. Such mechanism and apparatus for welding iron plates would undoubtedly be expensive, but not impracticable, and solid iron cupolas may thus be constructed.

Steel for Army Rifle Barrels.—Captain Caron, of the French army, has addressed a paper to the Academy of Sciences, Paris, describing a peculiar soft steel which has been experimented with by artillery officers in the manufacture of army rifles. It has been drawn cold and made into rifle barrels as thin as those of fowling-pieces and has exhibited a strength that has surprised all those who witnessed the experiments. A rifle was fired with 40 grammes of Esquerdes powder—the strongest in France—and gave no signs of bursting; then it was charged with 5 ounces of gunpowder and five balls, well rammed down, and discharged without producing a rupture. The only injury to the barrel was a slight swelling around the place where the balls had been placed.

Combined Iron and Wooden Ships.—In the last-preceding issue of the Scientific American we presented a brief description of a vessel under construction at Sunderland, England, by G. S. More, having an iron framing designed to be planked with wood. Mr. More has applied for an English patent, from the specification of which the following is condensed:—Ships have heretofore, in some cases, been constructed with an iron frame having a wooden planking fixed thereto, but difficulty has been experienced in employing copper fastenings when constructing ships in this manner, as the iron frame is found to be eaten away by the bilge-water all around the copper fastenings. Now, according to this invention, the inventor prevents the copper fastening from coming in contact either with the angle iron or with the bilge-water, by surrounding its upper end with another metal which has not the same prejudicial action on the iron. This he does by forming the hole the angle iron (which is to receive the fastening) of that larger diameter than the fastening, and inserting into it a tube of the projecting metal, which also extends a short distance into the wooden planking. This tube has a flange at one end, which lies against the angle iron; the fastening is passed through the projecting metal tube and the wooden planking, and is secured beyond by placing a ferrule or washer on it and clenching it. The head of the fastening within the vessel is then covered with a cap of the protecting metal, the edges of which are soldered all around to the edges of the flange of the tube before-mentioned. The preservative metal employed should be one which will not itself act injuriously on the iron, and which solders readily. Zinc or lead, or a mixture of these, either alone or combined with other metal, will be found most suitable in practice. According to this invention, also, he makes the ends of the two planks, where they meet, to lap the one over the other for a distance somewhat exceeding the space between the ribs, and he scarfs the ends, that is, he reduces the width of the planks where they overlap one-half. He arranges the joints so that they shall each fall correctly over two of the ribs, and he fastens the ends of each plank to each of the ribs by preference with fastenings such as hereinbefore described. In order to make the whole more secure he drives a bolt down vertically through the joint and intermediate of the ribs into the plank below.

Railroad Signaling by Electricity.—A patent has been taken out by J. Imray, of London, for actuating the distance-signals of railways by electro-magnetic apparatus. A column-stand is placed near the track, on which is a disk of the usual signal form or a colored light for a night signal. When this disk is turned in one direction it indicates that the line is clear; when it is turned in another direction it indicates danger. In the column is a train of clock work connected with an electro-magnet. This clock-work is held by a detent operated by the magnet which is connected by wires with the battery in the station. By touching a key in the station the electro-magnet sets the clock-work in motion and the signal is turned. A bell is also placed in the signal column, which is operated at the same instant, and the two signals are operated by the simple touch of the key. It also contains devices for reversing the signal.

Treating Jute and Flax.—Cheap vegetable fiber, such as those of Indian jute, may be treated so as to render it capable of being spun on cotton machinery by a process for which a patent has been taken out by John Thomson, of Dundee, Scotland. The jute is first divided into parcels weighing about 300 pounds each, and then sprinkled with a solution composed of 2 quarts of oil mixed in 3½ gallons of water in which 1 pound of soda has been dissolved. The jute is allowed to remain thus saturated for two days, then it is run between rollers and crushed, when it becomes very soft. After this it is steeped for one hour in a solution of cold caustic soda of a strength equal to 40° by Twaddle's hydrometer. Twenty-four gallons is about the quantity required for a bale of 300 pounds. It is next lifted and drained in a centrifugal drying-machine, then washed in water. After this it is steeped for about half an hour in very dilute sulphuric acid. This prepares it for the bleaching operation, which consists in steeping it for half an hour in a liquor of chloride of lime of 2° strength, after which it is drained, washed again, then steeped a second time, for another half hour, in very dilute sulphuric acid, once more washed, and the process is completed. A white fiber is thus obtained which is soft and easily carded and spun. The process is also applicable to manilla and other kinds of hemp and vegetable fiber.

Leather Cloth.

On several occasions we have directed the attention of inventors to the need of a cheap substitute for leather, but hitherto such a material has not been produced. It is true that American enameled oil-cloth has superseded leather for many purposes, such as coverings for stuffed chairs, lounges, settees, carriage-seats and covers, but it is unfit for the uppers of shoes, although its surface can be made to resemble morocco. The enamel of this cloth cracks and scales off when applied to shoes, but efforts should not be relaxed to improve it and obtain an article that will be free from this defect. At the present moment calf-skin and morocco leather are higher in price than at any period within our recollection, and the inducements presented for inventing a good cheap substitute never were so inviting. We learn from our European cotemporaries that such an article has recently been invented and introduced in England, by a Mr. Szerelmey, and that it is manufactured at Clapham. They mention that it is quite different in quality to enameled cloth, although it is made by a similar process. The London *Engineer* and the *Ironmonger* both give the following description of it:—

"The fabric used in the manufacture is entirely according to the kind of imitation leather wished to be turned out. Thus 'moll,' a very thick, soft kind of cotton fabric made at Manchester, is preferred for calf-skin; fine calico or linen for water-proof material for macintoshes, siphonias, &c., as perfectly water-proof as india-rubber itself; and alpaca, silk, cloth, or common cotton for boots and shoes, bookbindings, harness, carriage furniture and all the thousand purposes to which real leather is applied. What the composition of the pigment is, which in a few hours changes common cotton into a substance like enameled leather and only to be distinguished from the real article by its non-liability to crack and its greatly additional strength, is of course a strict trade secret. The mode of manufacture, however, is simple. The fabric to be converted into leather—silk, alpaca or whatever it may be, of any length or width—is merely wound on rollers beneath a broad knife-blade, which by its weight presses in and equally distributes the pigment previously placed upon it. A hundred yards may thus be done in a single minute, and in this most simple application the whole manufacture begins and ends, except that three coats of the pigment are necessary to perfect the leather, and an interval of twenty-four hours must elapse between the application of each. During this period the sheets are carried to a drying-house heated to a temperature of 94°, and where they are hung like oil-cloth, according to the order in which they arrive, the last comers displacing those which have completed their time and are ready for their second coat. Thus the manufacture never stops, and three days suffice to complete 'hides' of any length or breadth to which fabrics can be woven. For imitations of morocco or other marked leathers the long sheets are simply passed, when finished, through iron rollers, which indent them in any pattern required. For enameled leather the enamel is applied after the third coat, by hand-labor, which, though slower, of course, than that of machinery, is nevertheless rapid enough to cover the sheet in a very short time. The enamel, when dry, is infinitely superior to any description of patent leather. It is, perhaps, scarcely necessary to state that the pigment which transforms the cotton into leather is capable of being tinted to any shade that may be wanted; no admixture of india-rubber or gutta-percha forms part of it, inasmuch as the leather cloth when complete, even when left folded and exposed to considerable heat, is entirely free from the tendency to stickiness."

Attention, Inventors!

The *Country Gentleman*, one of the ablest and oldest agricultural journals in the country, has the following paragraph in reference to the demand for agricultural implements:—

"There never was a season when farm machinery was in more general demand over the country, and perhaps never one in which manufacturers and inventors seemed less inclined to advertise their latest and best productions to the public. Are they already receiving orders to the full extent of their capacity to supply them, or is there a lack of capital or enterprise somewhere? Sales are made this year for cash more readily than ever before. It might be a good lesson for our implement and machine makers to take one or two foreign agricultural journals—the London *Mark Lane Express*, for instance—and note the example set them by their brethren in trade abroad, whose full and largely illustrated advertisements weekly crowd the columns of the farmers' papers."

The Scientific American has been for years the channel of communication between the farmers and inventors, and the members of the latter profession will do well to note the demand existing, and govern themselves accordingly. We may be allowed to add, that many farmers who do not take the Scientific American would be benefited by doing so.

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CURIOUS INVENTIONS OF ANCIENT TIMES.

Iron Flies---Ivory Chariots---Liliputian Locks---Malleable Glass, &c.

In a quaint old volume entitled "The Wonders of the Little World; or, a General History of Man," published at London in 1774, we find some accounts of certain inventions which, in this day of universal improvement, will be found interesting as a record of the past. The chronicle serves to show the channels in which men's thoughts and ideas ran in remote ages; for many of the examples cited date back, through a long period of years, to the times of the Roman Emperors—to those of the Grecian gods and heroes, and, in some instances, even to the Chinese savan, Confucius. Let us see what one Regiomontanus did.

Petrus Ramus tells us of a wooden eagle and an iron fly made by one Regiomontanus, a famous mathematician of Nuremburg, whereof the first flew forth out of the city, aloft in the air, met the Emperor Maximilian a good way off, coming towards it, and, having saluted him, returned again, waited on him to the city gates. The second at a city feast whereto he had invited his familiar friends, flew forth from his hand, and taking a round, returned thither again to the great astonishment of the beholders.

A poet of the period, one Du Bartas, achieved some rhymes in honor of this event; but whether the lines were a paid "puff" or a disinterested contribution to the cause of science we have not yet learned. He thus describes the fly:—

> Once as this artist, more with mirth than meat,
> Feasted some friends whom he esteemed great;
> Forth from his hand an iron fly flew out;
> Which, having flown a perfect roundabout,
> With weary wings returned unto her master:
> And as judicious on his arm he placed her.
> O! wit divine that in the narrow womb
> Of a small fly, could find sufficient room
> For all those springs, wheels, counterpoise and chains,
> Which stood instead of life, and blood and veins.

If the vagaries of the fly were as wonderful as those of the poet's muse they must have been eccentric indeed. However, the idea is conveyed and that was probably the poet's principal concern.

In the twentieth year of Qeeen Elizabeth, Mark Scaliot, a blacksmith, made a lock consisting of eleven pieces of iron, brass and steel, all which, together with a pipe-key to it, weighed but one grain of gold; he made also a chain of gold consisting of forty-three links whereunto having fastened the lock and key before mentioned, he put the chain about a flea's neck which drew them all with ease. All these together—lock, key, chain and flea—being weighed, the weight of them was but one grain and a half.

Callicrates made pismires and other such little creatures of ivory, with that wonderful artifice that other men could not discern one part from another without the help of glasses.

Myrmecides was also excellent in that kind of workmanship. He wrought of ivory, a chariot with four wheels, and as many horses, in so small a compass, that a fly might cover them all with her wings.

Cornelius Van Drebble, that rare artist, made a kind of organ that would make an excellent symphony of itself, being placed in the open air and clear sun, without the fingering of an organist, which was (as is conceived) by the means of air inclosed, and the strictures [expansion and contraction—Eds.] of the beams ratifying the same; for in a shady place it would yield no musick, but only where the sun beams had liberty to play upon it, as we read of Memnon's statue.

Janellus Turrianus, a great master in the mathematicks, did usually delight the Emperor Charles the Fifth with miracles of study. Sometimes he sent wooden sparrows into the Emperor's dining-room, which flew about there and returned: and at other times he caused little armed men, to muster themselves upon the table, and artificially move according to the discipline of war; which was done so beyond example that the superior of the religious house of St. Jerome, being ignorant of the mysteries of that art, suspected it for witchcraft.

There was an artificer in Rome who made glasses of so tenacious a temper, that they were as little liable to be injured as those that are made of gold or silver; when therefore, he had made a vial of this purer sort, and such as he thought worthy of a present to Cæsar alone, he was admitted into the presence of the then Emperor Tiberius: the gift was praised and the skilful hand of the artist applauded, and the devotion of the giver accepted. The artist, that he might enhance the wonder of the spectators, and promote himself yet further in the favor of the Emperor, desired the vial out of Cæsar's hand, and threw it with such force against the floor that the solidest metal would have received some bruise or injury thereby. Cæsar was not only amazed, but affrighted with the act; but he [the artist?] taking up the vial from the ground (which was not broken but only bruised together, as if the substance of the glass had received the temperature of brass), he drew out an instrument from his bosom and beat it out to its former figure.

Here our ingenious artisan's zeal overcame his discretion, and the sequel will show how basely the Emperor rewarded such ingenuity. Our quaint chronicler adds:—

This done, he believed he had conquered the world, as he imagined that he had gained the acquaintance of Cæsar and raised the admiration of all the beholders; but it fell out otherwise, for the Emperor inquired if any other person beside himself was privy to the like tempering of glass? When he had told him **no**! he commanded to strike off his head, saying, that should this invention come to be known, gold and silver would be of as little value as dirt in the street. [This showed what a fool the Emperor was.] Long after this, in 1610, we read that amongst other rare presents sent by the Sophy [whoever he may be] of Persia to the King of Spain, were six glasses of malleable glass so exquisitely tempered that they could not be broken.

This is certainly a remarkable invention and is authenticated by Pliny (book 36, chap. 26); Sueton. in Tiberio; Xiph. in Tiberio (page 56); and other musty authorities long since moldered and gone. From the subjoined paragraph it would seem that the Waterbury Brass Mills had prototypes in olden times on essentially the same plans and operated mechanically on principles nearly identical.

At the mint of Segovia in Spain, there is an engine that moves by water, so artificially made, that one part of it distends an ingot of gold into that breadth and thickness as is requisite to make coin of. It delivereth the plate that it hath wrought into another that printeth the figure of the coin upon it; and from thence it is turned over to another that cutteth it according to the print in due shape and weight. And lastly the several pieces fall into a coffer in another room where the officer whose charge it is finds treasure ready counted.

In the examples above quoted we have many that show an ingenuity praiseworthy and commendable enough, and we cannot but wonder that it was expended on iron flies, ivory chariots, and diminutive locks attached by chains to fleas. The rather are we led to exclaim—why was not some of all this skill lavished on the arts and every-day duties which in that period stood in sore need of it? If the story of the malleable glass is not a fiction, and it would seem to be not, from the formidable array of names of "persons of the first respectability" attached to it, the ancients were far ahead of us in this respect; and we should be very glad to discover the process of making this substance for modern use. Perhaps in due time it will come around; and we, too, in our turn, may have our lack of enterprise derided by some future historian. In the days when balloons shall travel through the air as easily as birds, and mankind put on seven-league boots, then some future journalist, with the SCIENTIFIC AMERICAN before him, shall say: "The inventors of that age were tolerably ingenious; but *we*—we alone have that sovereign talent which shall rescue the earth from mechanical ruin!"

Rhubarb Wine for Sick Soldiers.

Dr. M. M. Marsh, Inspector of the U. S. Sanitary Commission for the Department of the South, has given to Rev. R. G. Williams, Delegate of the U. S. Christian Commission, a receipt for making rhubarb wine, which he says is the best remedy for dysentery and diarrhea as yet known. As these complaints are very common among our soldiers, and in the South quite apt to become chronic and fatal, it is hoped the friends of the soldiers will make up a good supply for their use, and forward it to the Sanitary Commission, or to hospital surgeons. The following is the recipe:—Peel and slice the stock of the leaf as for pies; put a very small quantity of water in the vessel, only just enough to cover the bottom; cover the vessel and gradually bring to a slight boil; then strain, pressing out all the liquid; to this liquid add an equal quantity of water; to each gallon (after mixed) add four to five pounds of brown sugar, set aside, ferment and skim like currant wine; leave in the cask and in bulk as long as possible before sending away. All wine is better kept in casks.—*Exchange.*

The Pacific Railroad.

The Springfield (Ill.) *Journal* states that Messrs. Ross, Steele & Co. have contracted to build 350 miles of the great railroad to the Pacific. This division or rather separate work lies within the boundaries of Kansas, beyond which the Union Pacific Railroad properly commences. It is intended to have the first 40 miles opened in the present year. In addition to the grants of lands and bonds made by Congress, it is stated that the company have also secured, by purchase from the Indians, over 500,000 acres of valuable lands on the route. These can be readily disposed of for cash, thereby furnishing in part means to extend the road as it progresses. The whole line through Kansas is to be completed within four years from date. The rails, spikes, &c., are already purchased, and the work will be pushed on vigorously without cessation.

MISCELLANEOUS SUMMARY.

AGRICULTURAL AND MECHANICAL COLLEGES.—The following States have accepted grants under the act of Congress of July 2, 1862, donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts:—New York, Pennsylvania, Illinois, Rhode Island, Minnesota, Vermont, Kansas, Kentucky, Missouri and Iowa. The General Land Office has in course of preparation the proper instructions which will serve as a guide to the officers charged with executing the act.

FAILURE OF STEAM POWER ON CANALS.—Several of our cotemporaries published in Western New York, state that the steam propellers which have been built to supersede horse-drawn boats on the Erie Canal, have not been successful; and, it is stated, that their engines have been taken out, and they are hereafter to be towed on the old-fashioned method, by horses. Is it impossible to operate steam boats on New York canals as cheaply as horse boats? Steam boats have successfully superseded horse boats on some other canals.

SMART FELLOWS.—A Southern newspaper announces with no little exultation that specimens of shoe-pegs have been produced at the workshop of the South Carolina Railroad. It is an encouraging evidence of the progress of the useful arts under stress of the blockade, and if the war continues two years longer, and the blockade puts the inventive and constructive faculty of the rebels to its trumps, it may yet rise to the dignity of clothes-pins.

AN amusing incident is told relative to the capture of Alexandria. Admiral Porter had succeeded in obtaining possession of it at a very early hour on the morning of May 6th. That evening the advance of the army rushed in with wild shouts of victory, when the admiral asked them "What are you making such a noise about? The place has been in my possession for the last twelve hours." The soldiers said nothing more.

A SHARP REBUKE.—The following is reported as a fact:—A Louisville Union lady, a few days ago called upon a secesh friend, and felt compelled to listen to her tirade. On rising to leave she noticed and praised a portrait of General George Washington, whereupon the rebel remarked, "I intend to get fine portraits of Jeff. Davis and Beauregard and hang one on each side of that." "Do," said Union; "we read in the Bible that our Savior was hung between two thieves."

THE new Territory of Idaho promises to prove unusually rich in natural resources, there having been discovered within its limits large quantities of the precious metal. It is stated that on the head-waters of the Missouri, near what is known as the Three Forks, immense deposits have been discovered, fully verifying the accounts which came from that quarter a year or two ago. The principal beds are near Bannock City.

LABORERS are so scarce in Michigan that in some localities women have been obliged to labor in the fields. Wages are high.

SOME of the inland lakes of Wisconsin are being stocked with white fish and trout from Lake Michigan, and they are said to thrive well in all the deep lakes.

Exports and Imports.

It is one of the anomalies of our condition of civil war that our foreign commerce is unusually prosperous, even with the draw-back of the depredations of the rebel steamers. The exports from New York to foreign ports, during ten months of the current fiscal year, amounted in value to $206,317,200, against about $126,000,000 in the corresponding period of the two preceding years. The imports thus far, this year, amount to $155,613,100, against $117,385,400 in 1862, and $196,795,200 in 1861. So we have exported at New York about fifty millions more than we imported. The revenue from customs at New York has been $43,421,008, against $26,814,182 in 1862, and $26,358,740 in 1861. In Philadelphia, Boston and other ports, a corresponding improvement is noticed, and by the 1st of July, when the fiscal year will come to a close, the balance of trade between Europe and this country will be found to be very largely in our favor.

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Artificial Culture of the Brook Trout.

The protection and culture of game fish is a subject to which some attention has been given, and which can still bear much more research and experiment. When trout are taken by scoop nets and small sieves, and thus destroyed by hundreds, it seems a proper time to turn attention to re-stocking those streams and lakes that have been entirely depopulated of this prince of fishes. The following account of, as it would appear, a successful pisciculturist, is cut from an exchange :—

"The only sure method of success in hatching the eggs, is to place them in troughs from eight to eighteen inches wide, according to volume of water, six inches deep, and from ten to fifty feet long, with a slight descent—enough to produce a gentle current, but not enough to move the spawn when placed in them. The bottom of these troughs are to be covered with two inches of fine gravel, and clean, coarse sand. The troughs are completed with a lid to cover tightly, and with screens at each end. They are now ready for the water. The water should be from one and a half to two inches deep over the gravel and eggs. The number of these boxes may be increased with the amount of water and number of eggs. The nearer the boxes are to the springs the better. The water from the spring should run directly into a box placed at right angles with the hatching boxes, to be used, say from three to fifteen feet long, twenty inches deep and wide, and drawn from this box through fine screens and spouts into the hatching boxes, graduating the amount of water required in each hatching box, to give the required depth to the water over the eggs. The boxes are now ready for the eggs.

"In my pond, the trout commenced spawning on the 12th of November, in 1860, on the 5th in 1861, and on the 3d in 1862, and finished each year from the 10th to the 15th of January. I am informed that in some other sections they commence in the first half of October. The female trout seldom come into the race until the very day they begin spawning. As soon as they commence to deposit the ova they should be taken out and the spawn procured artificially.

"Take out the trout in the race with a net, and place them in baskets, standing in the water, in some convenient place to handle them. Take a pan or pail with three or four inches of water in it from the spring, and place it near the baskets containing the trout. The eggs must be quickly extruded and the trout replaced in the water. This operation must not consume more than one minute if possible. All things being ready a female trout is taken out of the basket with one hand ; with the other gently rub the abdomen from the gills downward, and the spawn will flow in a continuous stream into the vessel. Continue the rubbing until the spawn is wholly extruded, then quickly replace the trout in the race, or separate basket. One side of the egg has a small, white speck ; here is where the impregnation takes place. This side of the egg being the lightest it always falls this side up, ready to receive the milt. We now have in the pail from 400 to 8,000 spawn, according to the age and size of the female. Now take a male trout from the basket, and, in like manner, or by the thumb and finger on each side of the abdomen, which requires rather more pressure, exude the milt. The milt falls upon the water and settles upon the eggs. I usually take from two to four males to impregnate from 2,000 to 8,000 spawn. In like manner I serve all the trout in the baskets. I then place the spawn and milt in shallow vessels, and put the dishes in the spring water, where I allow them to remain in the milt from one to twenty-four hours. Probably one hour is sufficient to insure impregnation. I took from 300 to 10,000 spawn daily, from the 3d of November to the 10th of January, making, in all, about 130,000 spawn, attended with perfect success.

"Commence at the lower end of the box, and lay the eggs on the top of the sand as thick as you can place them without touching each other. Proceed in this manner daily until you have filled the entire length. Should you choose, you can put partitions between each day's deposit, with date and number of eggs. A box one foot wide and twenty feet long will contain 100,000 eggs. It has been recommended to place the spawn in gravel from one to two inches deep, in imitation of the trout ; but I find by practice that the first method is the better one, as it will enable you to examine the spawn daily.

"The eggs will need to be examined every week or two, and all the dead or white ones picked out with a pair of forceps, made of No. 8 wire flattened at the ends. If the water is perfectly pure, and above 42° through the winter, but few will die. As the eggs die, a vegetable fungus, called *Byssus*, attaches itself to them, and throws out its little hairy fingers and clasps all the live eggs in their reach and soon kills them ; hence the necessity of having the eggs in sight. These hatching troughs should be covered with a house, containing a stove with fire, as it will make it more comfortable for the operator, and aid in keeping up the temperature of the water.

"The time of incubation depends upon the condition and temperature of the water. The water in my hatching boxes stood last winter at 38°, and at 40° in the springs. The springs are from eight to thirty rods from the box, brought in two-inch pipe tile, laid from two and-a-half to three feet under ground in water-lime. In this water the eggs commenced hatching on the 21st of January, seventy-eight days after they were put in the box, and they have been hatching in great numbers, daily, since. So far, my success has been beyond my most sanguine expectations, and should nothing befall them I shall have enough to stock a number of small ponds, at least. I took a few eggs from the race after they had been in forty days, and put them in a tumbler in my house where the temperature ranged from 50° to 60°. They hatched in 26 days after, 12 days sooner than those in the race. The egg has two skins or membranes ; the trout is formed between them. The first appearance of the egg, as viewed through a magnifying glass, is a red speck on one side, near the white spot before referred to. This, I think, is the heart. This is about the fortieth day. In two or three days more a fine artery is seen running each way from this speck around the egg. About the forty-ninth day the eyes are perceptible ; on the fifty-first day I could see the formation of the head and body ; on the sixtieth, could see the heart beat and the arteries running in all directions. It now shows life, and in a few days bursts the outer covering, but is still firmly attached to the egg, which, in fact, is a part of the young trout. The young trout, when first hatched, is about half an inch long, and looks and acts more like a wiggler you often see in rain-water, than a trout. It has no fins except the pectorals, just back of the gills. He lies upon his side almost constantly. On the fifteenth day all the rest of the fins are plainly seen, and he now takes on the appearance and action of a trout, and is constantly in motion, darting through the water with great rapidity. It lives upon this sack until it is all absorbed, which is about the fortieth day. At this time the young fish begins to seek its own living. He is now one and a quarter inches long.

"I found, last spring, that the young trout ate and thrived well on the yolk of hens' eggs, boiled hard and crumbled fine. After a few weeks, I fed them with hashed liver. I find this to be the best food for trout of all ages, as they grow rapidly upon it. I feed my trout once a day through the summer, and from two to three times a week through the winter, as they eat less in cold weather than in warm, and grow in proportion. I have 1,100 parent trout, caught with a hook in the small streams about. My largest pond contains sixty-one square rods ; water, fourteen feet deep. Four hundred of these trout were put in, two years ago last summer ; four hundred, one year ago, and about four hundred last summer. About fifty have been taken out for table use, and about the same number have died from various causes. They were from one to two years old when placed in the pond, so that they now range from two to five years old. A few are older. I fed them the livers, &c., from two beeves per week, during last summer. This furnished food so abundantly that they paid but little attention to flies or other insects. It cost me about seven dollars for food last year. The fish are very tame, coming regularly for their food ; they take it from a spoon or hand, and throw themselves clear out of the water, by the hundred, in their eagerness for it.

"The trout that hatched one year ago now, are from four to seven inches long, and are heavy compared with those in the streams in a wild state. Those two years old are from seven to nine inches ; three years old, from nine to eleven inches ; four years old, from eleven to thirteen inches ; and five years old, from thirteen to fifteen inches long. Trout four years old will average one pound in weight. The trout in my pond will weigh from one-quarter of a pound to two pounds each. With pure, cold water, and plenty of good, fresh food daily, trout will grow rapidly, and may attain a pound's weight in three years. Still, those of the same age vary much in size."

Habits of the Shad.

The habits of our fish have been very little attended to in this country. Our scientific men, it is true, have been very precise in their ponderous nomenclature ; they have described our fishes even to the shape of a scale or the number of thorns in the dorsal fin, but they have not condescended to note their habits, their food or their length of life, with all such particulars as would interest common readers and be of use to mankind.

No fish is more valued or more valuable than the shad, yet but few of its habits of life are known. The books are silent, and angling gives no information. It was for a long time a commonly-received opinion that the shad spent the winter in the Gulf of Mexico, and then, as the spring advanced and the snow-water ceased running, came along the coast and entered the rivers in succession. If this were true there would be no uniformity, year after year, in the run of shad in each river. The very distinct varieties would all become intermingled. But each river has its own variety ; those of Connecticut river have long been known as possessing superior size and flavor. The variety that seeks the Hudson as a spawning ground is easily distinguished from ours. The fact of the distinctness of the varieties in each river tends to the belief that shad go on further than the mouth of the stream in which they are hatched.

The habits of the shad are unlike those of other fish. As soon as the snow-water has ceased running, they press up the river as far as they can reach, in order to deposit their spawn. In following this instinct, they never stop for refreshment or food. Who ever found anything in the maw or stomach of a shad that would indicate the nature of its food ? Who ever knew them to bite a baited hook ? They do not feed from the time they enter the stream until they sink down thin and exhausted, into deep places at the mouth. For this purpose of nature, the shad has been preparing itself during the quiet luxuries of a winter, and has become fattened for the use of man or, if it escapes his net, for the production of its species. The shad lives but a single year. It is hatched in the early summer ; descends the streams as soon as large enough ; feeds and fattens in the winter at the mouth of the stream ; ascends in the spring to deposit its spawn, and descends to die at the bottom of the ocean. This fact accounts for the uniformity in the size of the fish. A Connecticut-river shad seldom goes beyond seven pounds, and the variation in size is comparatively slight. The bass, on the other hand, which is known to live many years, varies from half a pound in weight to fifty, even in our river. It has a long time to grow, and shows a much greater diversity of size. These considerations have led to the conclusion that one year is the duration of a shad's life.—*Hartford Courant.*

NATURE'S CHANGES.—Every seven years, we are told, the human body is renewed ; every particle of which it was composed at the beginning of that period will have disappeared before the end of it, and fresh matter will have been drawn from the earth, air and water to supply the void. So with the sea ; it is continually ascending to the clouds in vapor and descending in rain. The earth itself is subject to the same condition ; it is constantly decaying and must constantly be repaired. Like the pelican of the classic legend, it has to feed its offspring with its own body—vegetation of all kinds is perpetually preying on its vitals and robbing it of its most material essences. But when vegetation takes its natural course it returns to the soil, in its decay, as much as it withdrew when it sprung into existence, and thus a new crop is able to find sustenance in the ashes of the old one.

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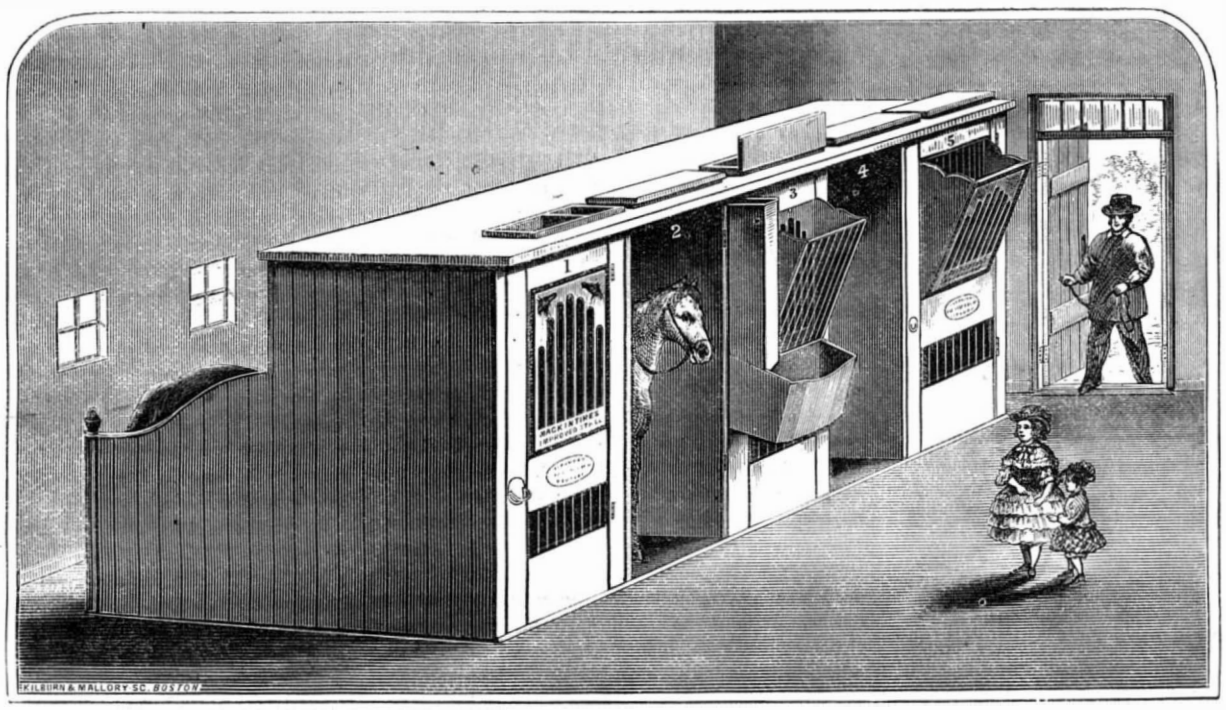
Improved Horse Stall.

The importance of paying attention to the health and comfort of horses is more generally appreciated at the present time than has been the case formerly. "A merciful man is merciful to his beast" says the proverb, and we may add that all reasonable expenditures and outlays tending to benefit the horse are generally returned in the renewed health, spirit and action of that valuable quadruped. We illustrate this week an improved horse stall wherein thorough ventilation and cleanliness are procured, and the condition of the animal correspondingly improved thereby.

By examining the cut the reader will perceive that the stalls show no chamber floor; they can be put up in this manner, or make the chamber floor the top. Stall No. 1, is closed, showing the apertures in front for air passing the horse's head, when he is



MACKINTIRE'S PATENT HORSE STALL.

either reclining or standing, to the opening above. When the top opening is closed, the foul air goes directly to the roof by a wooden chimney, which is not visible in the cut; the passages from all the stalls are connected. No. 2 is opened in front of No 3, leaving no obstruction for the egress of the horse; also, giving an interior view of stall No. 2, in front of No. 3. No. 4 has no front attached, and No. 5 shows the feed rack standing outward. Every vacant stall can be used as a passage-way, thus avoiding, in a long row of stalls, going the length of the stable to get the horse in his stall. They can be made a tight or box stall, and as the owner is not obliged to pass in by the side of his horse or over the excrement (there being no backing out), he avoids soiling his garments, also all danger from a vicious animal; to a timid person these stalls have many great advantages over common ones. Dirt is also excluded from the main floor, permitting the stable to be kept much cleaner. If it is inconvenient to feed from above, the proprietor can do it from the main floor, by opening the front for grain and bringing the rack out (as in No. 5) for hay. By keeping the ends of a line of stalls closed, except a doorway, the stalls would be darkened, preventing flies congregating, and also admitting perfect control over the draught; thus the horse can be dried in the stall; or in case of fire or of being cast, he can be liberated at once. The material of the stall being of iron, horses will not crib or damage them. Any one about erecting or remodeling stables would do well to look at the stable of the patentee in Woburn, Mass. We have seen a certificate from Messrs. J. F. Hovey and George D. Fenno, insurance agents, of Boston, and these gentlemen assert that the risk of insuring horses is very much lessened by the adoption of these stalls.

Models can be seen at Edward Riddle's horse and carriage bazaar, fronting Union street and Haymarket square, Boston. Patented on Jan. 14, 1862, by J. W. Mackintire; for further particulars address him at Nos. 17 and 18 Charlestown street, Boston, Mass.

A New Armor for Ships.

A new armor for ships has been constructed by a Mr. Chalmers, in England, and a section of it has just been tried by the authorities at Shoeburyness, with results apparently strongly in favor of the armor. This is described as consisting of three iron plates, joined edge to edge, of the thickness of three and three-quarter inches, and backed by a kind of cellular structure of alternate blocks of timber in a series of plate-iron cells. Behind this cellular backing is a second iron plate, one and a quarter inches in thickness, resting against a cushion of four-inch timber planking, and this against the skin of the ship.

The whole structure—containing as much total thickness of iron as the *Warrior's* target, but differently distributed—was bound together by thirty-three strong iron bolts, flush in front, and braced up from the inside by nuts and screws; a washer of india-rubber, half an inch thick, being on each bolt. By these arrangements Mr. Chalmers conceived he had obviated the evils which result from a backing composed of wood only—such as buckling; and that he had reduced to a minimum the injurious effects of vibration—such as the fracture of the armor plates, and the destruction of the fastenings and the frame of the ship.

This target bore all the tests, from a shell filled with sand, fired from a 10-pounder rifled gun, to a volley from two 68-pounders and three 110-pounders, and received no serious damage; but it was easily pierced by a 300-pounder, fired with a charge of 45 pounds of powder.

The Value of United States Coin.

In a late number of the *Bankers' Magazine*, there is a letter from the director of the U. S. Mint, in answer to certain inquiries as to the purity and value of American coin—gold and silver. The writer says that since 1837 the proportion of pure gold in all our coins is nine-tenths, or 900 parts in one thousand. British gold contains 916⅔ in one thousand. Bar gold is never absolutely pure. It is difficult and expensive to take out every atom of alloy. Fine bars are generally from 993 to 995 pure parts, and the exact fineness is stamped upon them. The five ounces of alloy in a thousand are generally silver.

The silver coins are nine-tenths pure. The only instance of debasement from this standard was in 1851, when the three-cent pieces were instituted, and they were made three-fourths fine. In 1853 they were raised, however, to the standard of other silver. In February, 1853, the weight of all silver coins but dollars was reduced by act of Congress; the half-dollar being reduced from 206¼ grains to 192 grains, and the smaller coins in proportion. The object was to make gold coin the measure of value, and place silver in a subsidiary position, as it has long been in English coinage.

Thoughts for Young Men.

Costly apparatus and splendid cabinets have no magical power to make scholars. In all circumstances as man is, under God, the master of his own fortune, so he is the maker of his own mind. The Creator has so constituted the human intellect that it can grow only by its own action, and by its own action it most certainly and necessarily grows. Every man must, therefore, in an important sense, educate himself. His books and teachers are but helps; the work is his. A man is not educated until he has the ability to summon, in case of emergency, all his mental power in vigorous exercise to effect his proposed object. It is not the man who has seen the most, or who has read most, who can do this; such a one is in danger of being borne down, like a beast of burden, by an overloaded mass of other men's thoughts. Nor is it in the man that can boast merely of native vigor and capacity. The greatest of all the warriors that went to the siege of Troy had not the pre-eminence because nature had given him strength and he carried the largest bow, but because self-discipline had taught him to bend it.

Atmospheric Phenomena.

The theory of Professor Espy, that rain may be produced in any locality by that disturbance of the atmosphere which results from great or continued conflagrations, is supposed to have found confirmation during the present rebellion. It has certainly been remarked that rain showers of considerable violence or duration have often followed or attended great battles. But this fact does not settle the question whether the immediate cause of those showers is the explosion of gunpowder. Indeed, before fire-arms were used in war, the phenomenon of rain after battle was noticed. Thus, Plutarch, in his life of Caius Marius, speaking of a battle that occurred about fourteen hundred years before the use of gunpowder in Europe, says:—"The opinion of Archilochus is confirmed, that fields are fattened with blood. It is observed, indeed, that extraordinary rains generally fall after great battles; whether it be that some deity chooses to wash and purify the earth with water from above, or whether the blood and corruption, by the moist and heavy vapors they emit, thicken the air, which is liable to be altered by the smallest cause."

AMERICANS in Mexico are of the opinion that the French expedition is a failure. Nearly 2,000 of their soldiers have gone over to the Mexicans within two months.

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Correspondence

Preparing Horn for making Combs.

Messrs. Editors:—You stated recently, in answer to a correspondent, that horns were prepared for making combs by boiling them in water and submitting them to pressure. I will describe another process that is practiced.

The horns are not prepared for pressing out by simply boiling them in water; but they must afterwards be boiled in fish oil. After being thus boiled, the horns—having been previously cut into suitable length and sawed through lengthwise—are spread open under the feet of the workman and inserted between flat surfaces of iron, which are acted upon by powerful screws. The pieces are slightly pressed in this stage, and left to cool, when they are taken from the press, and (not "split in two," only as now and then one is found too thick to press out) the rough parts hewn off. They are again subjected to boiling in oil and afterwards placed between the irons of the press and full power applied. In this way the horn is stretched until it is reduced to the proper thickness, which varies from $\frac{1}{16}$ to $\frac{3}{16}$ or $\frac{4}{16}$ of an inch, according to the kind of comb to be made from the plates. By this operation the horn is rendered nearly transparent.

Knowing that your object is to give reliable information through the columns of the Scientific American, I have ventured to give the above.

G. L. Bailey.

Portland, Maine, May 16, 1863.

[We are much obliged to our correspondent for the information which he has furnished. It is the description of a different and apparently improved process from that described by Dr. Ure, who states that the horns of goats and sheep are preferable to others, and, after being soaked for several weeks, they are boiled for half an hour in water, then taken out and sawed lengthwise, then boiled in water again to soften them, after which they are scraped, boiled in water again, and then submitted to a hot press. In France and Holland snuff-boxes are made with the clippings of horn and the shavings of tortoise-shell. the horn-turners soften the horn and shell in boiling water, then submit the mass to pressure in hot iron molds. Grease must not be allowed to touch the mass, or the pieces will not unite together. White horn may be stained red with a solution of aqua-regia; black, with the nitrate of mercury; and yellow, with nitric acid.—Eds.

Coal-mining in Rhode Island.

Messrs. Editors:—I notice in your issue dated May 16th, a paragraph stating that "coal is now being raised at Portsmouth from the Rhode Island coal-beds," and I have thought that some further information concerning this mine would prove interesting to some of your readers.

This mine was probably the first ever opened in the United States; the first shaft or "incline" being sunk more than fifty years ago. It has been worked more or less since that time; but unprofitably, so far as the owners were concerned, and with indifferent success otherwise, until the year 1858, when the mine, land and privileges were purchased by Messrs. S. L. & G. A. Crocker, of Taunton, Mass., and Capt. Wm. Cobb, of Dighton, Mass., the latter gentleman being appointed agent and treasurer of the company. The mine being full of water at the tmie of purchase, it was pumped out, and the "incline" was driven down further, so that now it measures 1,300 feet at an angle of about 35° and the coal is re-introduced into the market.

Prof. A. A. Hayes, State assayer of Massachusetts, has analyzed the coal, and says "it is a free-burning red-ash anthracite, without the usual sulphur compounds; being for smelting purposes, almost equal to charcoal." The company have been taking out about sixty tuns per day, all of which has found a ready sale for smelting, raising steam, as well as domestic purposes. It is particularly adapted to making malleable iron.

At present the works are stopped a few weeks for the purpose of placing new machinery into the mine. The old Cornish "plunger pump" is to be removed and its place supplied by three powerful rotary pumps of Fales & Jenks, placed respectively 450, and 700 feet below the surface, and driven by engines placed with the pumps; the steam for which is conveyed in packed pipes and a super-heater placed near the engines. A "best-best" crown-proof endless chain (made for the company in England), worked by a "sprockett" wheel at the surface, will raise and lower the cars upon the inclined track; the "tongue" of the cars being hooked into the links of the chain. B.

Dighton, Mass., May 16, 1863.

[We are glad to receive the above letter from our correspondent, and shall be pleased to receive any particulars which he may have in regard to the mode of raising coal, &c, as we understand that they are somewhat novel.—Eds.

Induced Magnetism in Tools.

Messrs. Editors:—All tools used in working metals, as those of lathes, planers, shaping and slotting machines, as well as drills, chisels, &c., become decidedly magnetic. This, however, does not exhibit itself uniformly. One of two tools—alike in every respect and used on the same metal—will often be a perfect magnet, the cutting point being the north pole and the opposite end the south; while the other exhibits northern polarity at both ends, and apparently to the same degree. The iron shaving cut by a lathe or planer is a perfect magnet—the south pole being the end at which the cutting tool first touches the metal and the north pole that at which it leaves it. Fine cast-iron turnings exhibit the same phenomena. In both these cases the induced magnetism remains for a considerable length of time.

E. J. H. H.

Philadelphia, Pa., May 25, 1863.

[In a former volume of the new series of the Scientific American, we called attention to induced magnetism in tools, especially the scrapers of mezzotint engravers. Steel and cast iron may be charged with magnetism, by hammering, vibrations, &c., but not soft iron. The fact is known, but the *why* is not. Magnetism is induced in a body by currents of electricity passing at right angles to it. A current passing on a copper helix surrounding a piece of steel forms a permanent magnet; passing around a bar of soft iron the metal becomes momentarily magnetized—forming an electro-magnet.—Eds.

A Friendly Response from an Inventor.

Messrs. Munn & Co.:—Please accept my thanks for the able and expeditious manner in which you conducted my business with the Patent Office Department as my agents in the matter of preparing specifications, making drawings, forwarding the same and procuring the patent for my water-lute and stench-trap as applied to sewers; also, for the flattering notice, lucid description and elegant engraving of it that appeared in your valuable journal. The thorough manner in which yourself and your able corps of assistants transact your business, and the natural pride you evince in having your services duly appreciated by your clients, has induced me, unsolicited, to address you this note. T. B. Voorhees.

New York, May 25, 1863.

A New "War Turtle."

Mr. Boyd Elliott, late editor of the Scientific American, has invented a plan for a vessel, which he calls a "war turtle." It is claimed for it that, compared with the *Monitors*, it is very simple in its construction, and is estimated not to cost one-half as much; it is built of iron, and intended to carry four guns. Like a turtle, though of the "hard shell class," it is designed to move conveniently in any direction, or to all points of the compass. It furnishes, also, all the advantages of a revolving turret without the expensive machinery now required for it, and is capable of being built more firmly.—*Pittsburgh Chronicle.*

[We do not know about the "turtle" part of the paragraph, but if it is as great a myth as "Mr. Boyd Elliott, late editor of the Scientific American," we fear it will not accomplish much. No person by that name has ever been an editor on this paper, and we know nothing about him or his "turtle."—Eds.

VALUABLE RECEIPTS.

Painting the Floors of Piazzas.—The floors of piazzas fronting the South and East are liable to leak during severe rain storms. A good cement for the seams of such floors has been a desideratum. An acquaintance of ours who had been much annoyed with the floor of his piazza leaking, was advised to try a cement composed of dissolved india-rubber and asphalt, and he did so, stopping the leakage perfectly. When the cement was sufficiently dry he painted the floor with drab colored oil paint, as a finish to the whole, and completed the operation one evening about sundown. Next morning he went out to examine his piazza, expecting to find the paint partly dry, and the floor improved in appearance. Judge of his surprise when he beheld the black india-rubber cement which he had used floating like bubbles upon his drab paint, and the whole coating of the floor in an undelightful state of spissitude. The oil of the paint had acted upon the cement as a solvent; and the thought which first suggested itself to him was, that although the cement could stop leaks, it was impossible to paint over it. Thinking upon the subject during the day, the idea was presented to his mind that, if he covered the cement with a coat of varnish, he could paint over this when it became dry, and the oil of the paint would not penetrate under it. He acted upon this idea, and has now a most perfect and beautiful rain-tight piazza floor. Others may profit by such experience. Hot pitch is a good water-tight cement for the seams of floors, &c., but it is liable to become soft in hot weather. Linseed oil, boiled with the flowers of sulphur, makes a cement resembling dissolved pitch, and is second to none for stopping leaks in such floors; it is also a great preservative of wood. It is employed for coating the knees of war-ships in the French navy, to prevent dry rot. A cement composed of white lead, oil, and pulverized white sand or glass, is about the best that can be used for such purposes.

Cement for Brick Walls.—A correspondent of one of the Philadelphia papers states that, during a recent north-easterly storm, the rain penetrated through the brick walls of many houses in Philadelphia, and dislodged the inside plastering from them. It is well known that along our Eastern coast the walls of brick houses exposed to storms from the Atlantic will be completely penetrated with water to a depth of two feet, unless they are coated with some water-tight substance. Bricks are very porous and absorb moisture freely, hence brick gable walls exposed to such storms are usually covered with a thick coat of plaster, put on with a brush. One of the best water-tight compositions that can be employed for such walls is a mixture of hydraulic cement and boiled linseed oil. When dry it is perfectly water-proof.

How to make a Silver Tree.—Mix one part of a saturated solution of nitrate of silver with twenty parts of distilled water, and pour the mixture upon two parts of metallic mercury in a phial, The phial is now to be left standing quietly for several days, when the mixture within will put forth branches, and the figure of a beautiful tree of silver will appear to grow from the mercury.

Silver Shrubbery.—Take a piece of clean copper wire and bend it into the form of a shrub, then lay it upon a plate of glass, over which has been poured some nitrate of silver. In a few hours afterward the copper wire will be covered with brilliant ramifications of silver. A solution of nitrate of silver, poured over a clean plate of copper, also produces a silver formation resembling leaves and branches.

Silvering Silk.—When a piece of silk is dipped into a solution of the nitrate of silver, and then exposed wet to a current of hydrogen gas, the nitrate is reduced, and the silk is covered with a coating o silver.

A novel mode of lighting has been introduced at a Baptist church, just built at Philadelphia. There is not a gas-burner in the audience-room. In the panels of the ceiling are circles of ground glass, two feet in diameter. Above each of these, in the loft, is an argand burner, and over the burner a powerful reflector. The effect is just about the same as if there were thirty full moons shining in the ceiling. The light is not sharp and intense, but abundant and mellow, and not painful to the eyes.

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The Pendulum a Measure of Length.

A pendulum, so adjusted as to vibrate once in every second, must have a certain unalterable length, and this has been so made and used with great success for many important scientific objects. But, though this approaches most nearly to a natural fixed measure of length, it is far from being perfect. In favor of the pendulum may be stated the ease with which the operation of measuring may be performed, the possibility of using it in every part of the globe, and the facility of transporting it from one place to another both by sea and land. On the other hand, it must not be overlooked, that, being made of metal, it is liable to expand by heat and contract by cold; so that if adjusted to the second of time at Greenwich, it could not be relied on if carried to the tropics or the Arctic regions, in both of which cases it would alter in length, in the former becoming longer, in the latter shrinking in size. But the most serious and fatal objection to be urged against the use of the second pendulum as a natural fixed measure of length, is, that the density of the globe is known to vary considerably in various parts. The modern yard measure is based upon the length of a pendulum beating in seconds of mean time in the latitude of London, in a vacuum at the level of the sea, and is in the proportion of 36 inches to 39 inches and $\frac{1393}{10000}$th parts of an inch.

A Cure for Rheumatism.

The following receipt for the cure of rheumatism was published some time ago in the *Country Gentleman*:—

"Bathe the parts affected with water in which potatoes have been boiled, as hot as can be borne just before going to bed; by the next morning the pain will be much relieved, if not removed. One application of this simple remedy has cured the most obstinate rheumatic pains."

The annexed letter to that periodical appeared in a recent issue, testifying to the utility of the potato water:—

MESSRS. EDITORS:—I take the opportunity of returning my sincere thanks to you in behalf of my "better half," for a very simple receipt, which consisted in the use of potato water for rheumatism. My wife suffered over four years with rheumatism in her shoulders, especially after doing the family washing, until I discovered this simple but most valuable remedy. The first night she used the potato water rather lukewarm, and assured me of its benefits next morning, and that she hardly felt any pain in the shoulders, which encouraged us, and we renewed the application the following night before she retired, using the potato water as hot as she could bear it, and rubbing her shoulders as hard as she could; the effect was that she never, since the last application, now about fourteen months, has had the slightest pain of rheumatism in her shoulders or any other part of her body. Many persons in this country, especially miners, are afflicted with that malady, and I have requested many to try the remedy, but they regard the value of "potato water," in the same light as a great many do the "brandy and salt" cure, viz.: drink the brandy and rub the afflicted parts with the bottle. Then again both these remedies are so cheap that it is thought they cannot be good. JACOB FRITZ.
Fort Walla Walla, W. T.

Spinning Yarn from Cotton Rags.

A letter in the London *Times*, from its Paris correspondent, contains an account of a new machine invented by a French engineer, by which, it is said, "cotton rags of every description may be rendered fit for spinning." With respect to the value of the invention the *Times* says: "It will effect a revolution in industry and increase public wealth to an immense extent. When it is considered how many millions are expended in the purchase of raw cotton, and the short time the manufactured article lasts, every machine that can render worn-out cotton cloth available for spinning, must render great service to the manufacturer." The most that can be said for this invention is that cotton shoddy may be spun with it; but it is of doubtful utility. Cotton becomes weak in the fiber after being woven into cloth and worn for some time. The best use to which cotton rags can be applied is in the manufacture of paper, for they cannot be made into strong cloth.

STEAM ON CANALS.—The experiments with steam navigation on the Erie Canal are said to have proved unsatisfactory. One firm have taken the engines out of their boats and are having the vessels converted into horse-towing boats, and the Rome, Watertown & Ogdensburgh Railroad Company have withdrawn their eight propellers and sold them to the owners of the Delaware & Raritan Canal.

The Habits of a Man of Business.

A sacred regard to the principles of justice forms the basis of every transaction and regulates the conduct of the upright man of business. He is strict in keeping his engagements; does nothing carelessly or in a hurry; employs nobody to do what he can easily do himself; keeps everything in its proper place; leaves nothing undone which ought to be done, and which circumstances permit him to do; keeps his designs and business from the view of others; is prompt and decisive with his customers, and does not overtrade for his capital; prefers short credits to long ones, and cash to credit at all times, either in buying or selling; and small profits, in credit cases, with little risk, to the chance of better gains with more hazard. He is clear and explicit in all his bargains; leaves nothing of consequence to memory which he can and ought to commit to writing; keeps copies of all his important letters which he sends away, and has every letter, invoice, &c., belonging to his business, titled, classed, and put away; never suffers his desk to be confused by many papers lying upon it. Is always at the head of his business, well knowing that, if he leaves it, it will leave him; is constantly examining his books, and sees through all his affairs, as far as care and attention enable him; balances regularly at stated times, and then makes out and transmits all his accounts current to his customers; avoids, as much as possible, all sorts of money matters and law suits where there is the least hazard; keeps a memorandum-book, in which he notes every little particular relative to appointments, addresses, and petty cash matters; is cautious how he becomes security for any person, and is generous only when urged by motives of humanity.

Fish as Food.

There is much nourishment in fish, little less than butcher's meat, weight for weight; and in effect it may be more nourishing, considering how, from its soft fiber, fish is more easily digested. Moreover, there is in fish a substance which does not exist in the flesh of land animals, viz: iodine—a substance which may have a beneficial effect on the health, and tend to prevent the production of scrofulous and tubercular disease, the latter in the form of pulmonary consumption, one of the most cruel and fatal with which the civilized, the highly-educated and refined are afflicted. Comparative trials prove that, in the majority of fish, the proportion of solid matter—that is, the matter which remains after perfect desiccation, or the expulsion of the aqueous part—is little inferior to the several kinds of butcher's meat, game or poultry. And if we give attention to classes of people classed as to the quality of food they principally subsist on, we find that the ichthyophagus class are especially strong, healthy and prolific. In no class than that of fishers do we see larger families, handsomer women, more robust and active men, or a greater exemption from maladies.

A Great Melting Furnace.

We learn from the Pittsburgh *Despatch* that a great melting furnace—probably the largest in the world—has lately been completed at the Fort Pitt Works, of Messrs. Knapp, Rudd & Co. It is eight feet in width and thirty-one feet in length—divided into three interior compartments—the "grate bars" seven feet; "pool" six feet, and "kitchen" eighteen feet. The stack rests upon a foundation of thirteen feet square and twelve feet in hight, above the surface level. It is twelve feet exterior diameter and nearly sixty feet in hight. It was built under the supervision of Mr. Joseph Kaye, the foreman of the foundry. The Fort Pitt foundry is now supplied with six furnaces, of an aggregate capacity of about one hundred and twenty-one tuns daily. It is stated that this furnace was first charged on Thursday, the 14th ult., with 38 tuns of metal, for the casting of a 15-inch gun. The metal was piled in the furnace, and fire applied between eight and nine o'clock, A. M. Between three and four P. M. the immense mass was completely reduced; the furnace was tapped, and a stream of iron poured into the mold.

DURING the three months ending April 1st, there were exported from Boston 154,904 cases of boots and shoes. This is a large increase over the exports during the same period in 1862—those amounted to but 92,469 cases.

General Steam Cultivation Company.

A large joint-stock company has been formed in London, England, with a large capital, for the purpose of introducing steam plows among the British farmers upon easy conditions. They undertake to furnish any respectable farmer with the apparatus that he prefers on lease, or rather on job—taking from him such a rent, spread over three, five, seven, or ten years, as will repay, in one of these periods, both the interest on, and the cost of the implement. It is in fact, a Farmers' Loan Company, finding machinery required for immediate use, to be paid for in such instalments as will enable the lessee to earn each instalment before he pays it. Deep cultivation is possible on certain soils with horse-power, but every additional horse beyond two abreast is a difficulty and a disadvantage. On the stiffest clay soils, except in very rare seasons, deep cultivation by horse-power is simply impossible. If enough horses can be worked together to pull the implement through, and "smash up" the earth, their trampling does a degree of harm that balances the use of their power. Steam cultivation, and steam alone has solved this difficulty. It ploughs up, and "smashes up" the stiffest clays to the depth of a foot more easily, and more advantageously, than horse-power could work three inches.

A French Weather Prophet.

A correspondence has lately appeared in the Parisian journals, between M. Mathieu de Drome, formerly one of the Legislative Assembly, and M. Le Verrier, the eminent astronomer. M. Mathieu belives that he has discovered a rule for predicting the weather, and bases his theory on meteorological observations taken at Geneva. M. Le Verrier first examines these data, and then laughs at his former colleague. He proves that the tables quoted by M. Mathieu contradict at least as often as they support his theory. M. Verrier observes that the people who profess to predict the weather are of two classes—those who prophecy at fixed days and hours, and those who content themselves with foretelling general phenomena of particular seasons. The first class announce that it will rain, or freeze, or snow, on a certain day. This, if positively done, makes the prophet the lion of the hour. When the time comes round, if he is wrong, he loses his reputation, if his prophecy has not been forgotten; if he is right, he makes a great noise. The more prudent content themselves with prophesying a hot August or a windy March, and secure even betting in their favor. Such persons are like a man playing at dice who bets that he will throw seven against another who says he will throw twelve; the former has six chances in his favor, the latter only one. Weather prophets are only guessers, and of course, they sometimes guess correctly.

How the Guns of the "Keokuk" were raised.

The Charleston *Mercury*, of May 7th, thus describes the process of raising the guns of the *Keokuk*:—

"By order of General Ripley, Colonel Alfred Rhett, on the 17th, after the departure of the ironclad fleet, examined the wreck, and reported the attainment of the guns practicable. Mr. La Coste, assisted by Adjutant Boyleston, and a detachment of men from Fort Sumter, under different lieutenants, have effected the saving of these fine pieces of ordnance with much trouble. Latterly the *Keokuk* has been entirely submerged, and in rough water. The turret had to be unbolted or unscrewed and taken off before the guns could be slung for removal. This was an unpleasant job of some difficulty, the labor being performed under water, when the sea was smooth, and in the night time only. Those engaged in the undertaking, going in the small boat of the fort, were sometimes protected from the enemy by the presence of our gunboats, at other times not. One gun was raised last week, being removed by the light-house boat. General Ripley himself, night before last, went down to superintend the removal of the second gun."

IN Manchester, N. H., the Amoskeag Company are now using about thirty bales of cotton per week; in full operation they use about four hundred bales. The Stark mills use thirty bales; their maximum is three hundred bales. The cotton mill at Mittineaquo is running half its machinery full time.

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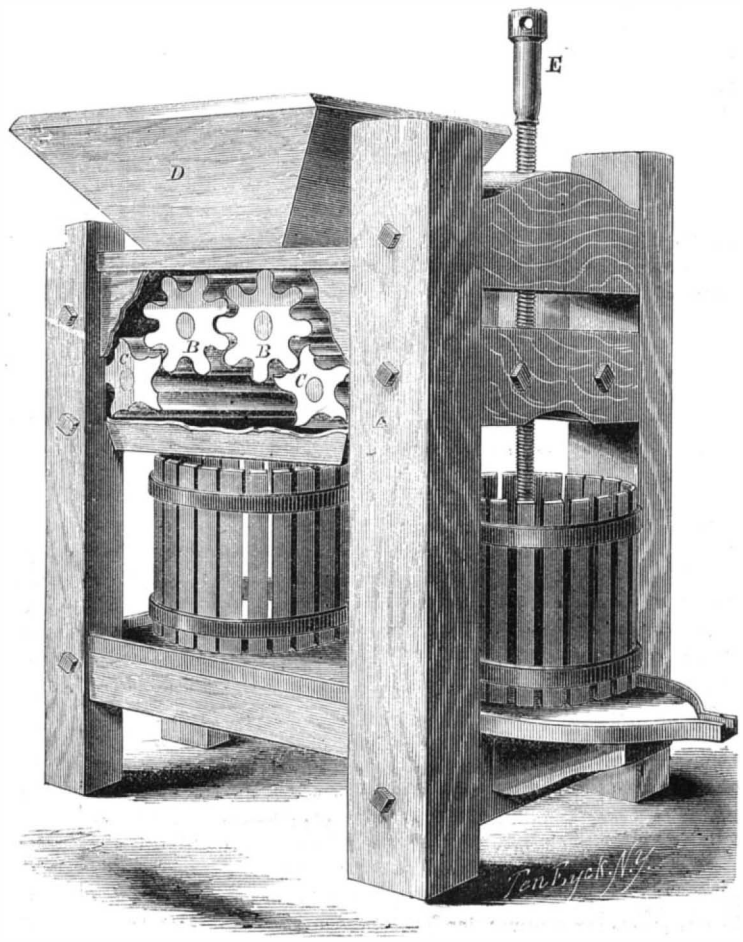
Improved Mill for crushing Cane, Fruit, &c.

Our engraving is a representation of an improved mill for crushing fruits or cane, for the purpose of securing the juice of the same. It consists of a stout wooden framing, A, in which are mounted the crushing rollers, B; part of the framing being removed at the side in order to show their position. These rollers are fitted with two others, C, termed cleaners, whose teeth are of a peculiar shape. These cleaners are actuated by the crushing rollers, and as the latter revolve by power, the cleaners' projections work into them in a similar manner to the teeth of gears. The object of this arrangement is to remove the pomace or other waste from the crushing rolls, as it sometimes collects in large quantities, and very greatly impairs the efficiency of the mill. We think this a decided improvement, and one of general utility in every cider mill. The hopper, D, contains the material to be operated on, and it has a small slide at the bottom to regulate the quantity which passes down to the roll. Below, on the frame, are the tubs and press, worked by the long screw, E, for squeezing the pomace or must, after it has been ground by the crushers. The trough at the end directs the fluid into any receptacle placed at that point. This apparatus is portable.

A patent for the invention was procured through the Scientific American Patent Agency, by J. H. Ellis, of Brooklyn, Pa., on February 4, 1862; further information can be had by addressing the inventor, as above.



ELLIS'S PATENT CIDER MILL.

AUTO-TYPOGRAPHY.

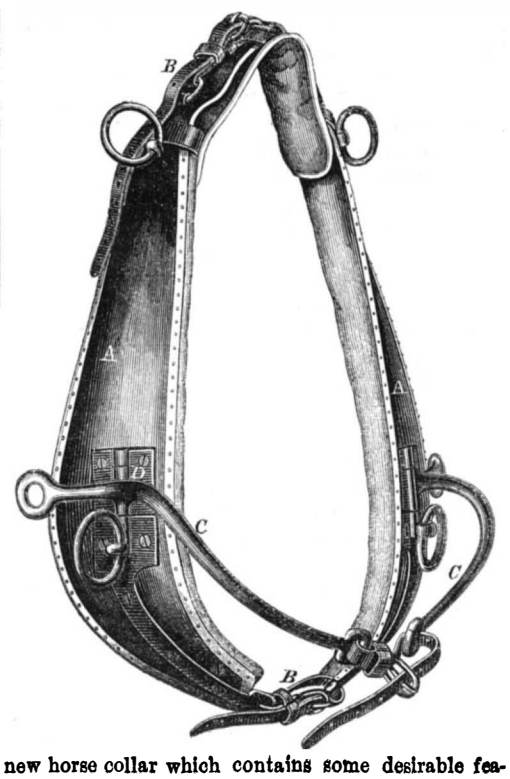
The above is the name of a new art, described in the London *Photographic News* by its inventor, George Wallis. It consists in making drawings of subjects with a peculiar hard ink, upon glass, gelatine or paper, and then transferring impressions of those drawings, by pressure, to a metallic plate, from which copies are printed. A peculiar glutinous-colored ink is made, containing some very fine emery; and with this a drawing is executed upon a sheet of transparent gelatine—that being a good material for drawing upon. The ink is laid on the drawing in reverse to the colors of an oil-painting, that is, the higher relief parts are to form the shadows of the printed copy, because these make the deepest impressions on the plate when transferred. After the drawing is executed and the ink has become dry and hard, the sheet of gelatine is placed upon a plate of glass imbedded upon a sheet of india-rubber laid in a recess formed in a steel bed-plate. A plate of smooth Britannia metal is then placed upon the drawing, and the two plates are run between graduated pressure rollers. By this operation an impression of the drawing is made on the plate of Britannia metal, which is afterwards employed in the same manner as engraved steel plates that are employed in bank-note printing. But by the new mode the impression is made direct from the drawing to the plate, while the old mode is simply employed to duplicate costly engravings. Six plates have been obtained from one drawing; but, as these are much softer than steel, a very small number of prints can be taken from them. This invention contains the germs of great usefulness, and it may be developed by further improvements to become an important art.

Collodion for Photography.

The following is the method practiced by M. F. Zuchs of Paris, in manufacturing collodion for photographic purposes:—Into a glass vessel put 20 pounds of common sulphuric acid and 9 pounds of saltpeter reduced to powder and stir the mixture with a glass rod. At the expiration of ten minutes add 1 pound of finely-carded cotton, and allow it to remain covered with the mixture—stirred occasionally—for about ten minutes, at a summer temperature, then lift and thoroughly wash it in soft water. No traces of acid must be left in it. It is then pressed between the folds of a cotton cloth, so as to remove all the water and leave it slightly moist, when it is placed in a vessel containing alcohol and allowed to remain 24 hours. It is next squeezed to press out the alcohol then introduced into a mixture of 2 parts alcohol, of 90 degrees strength and 20 parts double rectified ether of the specific gravity 0·730. In this the prepared cotton dissolves and forms an excellent quality of collodion.

FISHER'S PATENT HORSE COLLAR.

The subjoined engraving is a representation of a new horse collar which contains some desirable features not hitherto observed by us in appurtenances of this kind. It adds materially to the efficiency of the animal, by throwing the strain on the place where the power is exerted to the best advantage; it can also be accommodated to suit any horse, and does not chafe or wear the skin or cause sores by friction. By referring to our description the reader will readily understand the operation and adjustment of the collar. It consists of the two side-pieces, A, connected at the top and by leather straps, B, and of the hames, C, working in hinged joints, D, secured to the side-pieces. On the upper part of the side-pieces are secured the rings through whichthe reins pass, and at the bottom those to which the pole straps are fastened. The hames have long curved ends, which pass around to the breast of the horse and are there fastened to each other by a strap. It will be seen that on letting out or taking up the straps at the top or bottom of the collar, as occasion requires, the same may be readily adjusted to any horse; and, also that, each side being independent of the other, it has none of that sliding, oscillating motion so trying to the skin of the beast. All chafing is prevented, says the inventor, by the adoption of this collar—a thing of no small importance to the owners of fine animals. Also, by the position of the hames and their independent motions, which conform to the natural workings of the horse's shoulders, his power is exerted most favorably on the work, and he is consequently less tried and harassed by his duty. The hames also serve, in a measure, to hold the collar in place on the animal's neck and contribute further to reduce the friction on the same. These seem to be desirable features and are accomplished fully by the invention.



The patent for this invention was procured through the Scientific American Patent Agency, on July 17, 1860, by Mr. C. J. Fisher, of Waukou, Iowa, and further information can be had by addressing him at that place.

THE VALUE OF SMALL PATENTS.

The value of small inventions is aptly illustrated in the following paragraph. Probably not even the inventor himself realized the value of his idea when he first conceived it:—

"Three million pairs of metal tips are annually applied to the toes of children's shoes. It is claimed that one pair will outwear three pair without tips; this would make an annual saving of nearly six million dollars to those that use them, an important item at the present time. An individual who has three children says that since he commenced buying metal-tipped shoes (one year ago) he has saved the price of new boots for himself."

BEET-ROOT SUGAR IN AUSTRIA.—At the present time there are 126 beet-root sugar manufactories at full work in the Austrian dominions, and eleven more in course of erection, seven of which are in Bohemia and four in Moravia. Of those now at work, sixty are situated in Bohemia, twenty-seven in Moravia, twenty-one in Hungary, ten in Austrian Silesia, five in Austrian proper, and three in Galicia. These 126 establishments last year worked up 13,876,721 centners of beet-root, and paid to their Government 5,246,125 florins for duty. As compared with the previous year, these figures show a falling-off of 319,130 centners of beet-root and 119,874 florins less duty.

AT one of the largest tin and copper mines in West Cornwall, England, lately, while nine men and a boy were ascending to the surface in a tram-wagon, the chain broke when they had nearly reached the top, and they were hurled down the incline at an ever-increasing velocity, to the bottom of the shaft, and every one killed on the spot.

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NEW YORK, SATURDAY, JUNE 6, 1863.

A DEMAND FOR IMPROVEMENTS--BRING OUT YOUR INVENTIONS!

At no time within the past few years has the demand for machinery and new and useful inventions been so great as at the present hour. The call of war has taken the thew and sinew from the plow, the loom and the anvil, and the wheels in the workshop run slowly and the pulses of the factory throb more feebly by reason of it. On a hundred battle-fields the sons of labor lie dead and dying, and scattered far and near, from the Gulf of Mexico to the Penobscot, those who formerly bore the heat and burden of manual labor now shoulder the musket and fight manfully for our liberties and rights. What shall we do?—how shall we supply their places? Clearly the workshops must not stop their operations because war prevails. Clearly the arts must not be overcome, although the enemy is; and if we take vital energy and human intelligence from the scene of labor, we must supply its place with machines which, although they cannot think, approximate in some degree to mortal powers. You who have a model of a new invention at this moment lying idle in your workshop or your private closet, which needs but a little more study to perfect it, reflect for a moment —has not some idea struck you? If so, seize pencil and paper and sketch out the newly-caught inspiration before it fades and is gone. Robert Bruce watched the ant toiling in vain for six times with its load, each time defeated but still persevering; on the seventh it overcame its difficulties. Think of that Scottish chief taking lessons from the humblest insect and marching forth to conquer; like him press on!—not as he, to slaughter and rapine, but to peaceful and bloodless triumphs.

These words of cheer and friendly counsel are not addressed alone to the professional inventor, but are applicable to all who, having a love for mechanics and the arts, strive to improve it, both to their own and their country's benefit and renown. Old inventors are not easily disheartened, but neophytes are; they are apt to think, when their plans fail, that it is owing to their incapacity, or from a lack of public appreciation for their merits; they lose confidence at the critical time, and throw away weeks and months of brain-work and patient research. There is hardly a youth in a trade, be it of what branch it may, that has not some plan in his head for a new tool or a new machine, as yet dimly foreshadowed, which shall lessen the severity of human labor, and lighten the curse pronounced upon our race. To these, in whatever part of the country they may be, we would say, fall to work on the instant and make a detailed drawing and plan of your work. If you are too poor at present to make a costly model, whittle one out and put it together in that way; we have seen many a beautiful piece of work made with a jack-knife, and they answer as well at the Patent Office, in simple cases. Jealousy is not yet, unfortunately, rooted out of the human breast, and inventors sometimes meet with those who sneer and taunt and throw every obstacle in their way; but this should not discourage them, it should rather stimulate them to new exertions; it is only the sound metal which stands the wring and twist. Very often the manufacturers of the country come forward and demand a machine for a particular service, and it appears almost at their nod and beck, from the fertile brains of our inventors. We hope soon to be able to chronicle a more rapid increase of labor-saving machinery than ever before.

STRIKE AT EMINENCE!

The world waits and the wheels of science falter, at times, in their onward course. The very movements and developments in the mechanical world appear, at certain periods of the century, to be blocked or impeded, and all the material matters dependent on its harmonious action linger apparently until some new impulse sets them going again. What is this new impulse? Genius, talent and mental energy of the first order. Watt came among the dull and plodding artisans of his time, and, boldly attempting new theories, based on scientific principles however, gave the wheels of civilization such an impetus that they run the faster for it to this day. So did George Stephenson, the uncouth, unlettered attendant on his father; working in a coal mine, by his parent's side, he achieved, not suddenly but slowly and patiently, the knowledge which afterwards made him so eminent. Men have existed in every age who seemed created for the special purpose of advancing the interests of the great human family. These men were not prodigies; with some exceptions they were hard working, thinking, self-tutored individuals—men who, by self-abnegation and denial of irrelevant matters, so disciplined their minds that study became a pleasure and research relaxation.

How profitably in our modern day we might imitate the examples of those wise and eminent scientists who are now far removed from the scene of their labors! For just so surely as the sun performs his daily round, so certainly will the services of philosophers and savans be required in the economy of the world. Even now, at the lathe, the vice or the anvil, possibly some restless mind big with inspiration seeks an outlet for its abundant wealth. To such who linger in doubt, to those upon whom pecuniary circumstances bear heavily, we would say be of good cheer? for the future is as certain to be bright to the deserving, as the rainbow is to appear after the thunder-storm. And we have only to look back upon history to find the fullest confirmation of our remarks. There is no toil without reward, no struggle without a victory, and the light is more dazzling to those who emerge from darkness than to those who have continually basked in the noontide ray.

We urge every young man in any branch of trade or manufacture to give a certain portion of his time to mental exercise. Think, and be strong! Strike at eminence, and if you do not attain it you will at least rise intellectually above the ignoble throng who despise that wealth which riches cannot buy and who ignore all the advantages to be derived from the world that teems with information useful to the race. Strike at eminence! and be not content with that superficial knowledge which smacks of attainment, but which is to real acquirement what a thin veneer is to the precious wood.

WORKING-BEAM ENGINES.

It is not a little remarkable, in the history of the present struggle, that the beam engines in the naval service should have escaped material injury—that all steam engines, in fact, above and below the water line, have been but slightly damaged, considering their exposure. He would have been a rash man who had predicted at the beginning of the rebellion that steam machinery in our gunboats would have escaped, while the hulls of the ships themselves have been riddled by the fire from forts and batteries with which they have been engaged. Of course, when it has been necessary to blow up some of our vessels, the engines have been scattered with the other fragments, to the four winds of the earth; but we have not yet upon record any instance where a beam engine particularly has been entirely crippled for any length of time, still less destroyed. When the wrought-iron strap of a working beam breaks, the skeleton is also fractured, the piston is forced out through the cylinder head, the front links are bent, the frame is thrown out of line, in short, there is dire confusion and utter wreck. It is a comparatively easy thing to predict what would occur in case a huge round shot struck a working beam; in fact, there is no question but that it would place the machine *hors du combat* instantly. Since, however, we have no data to refer to, no such incident having ever taken place, all inferences are gratuitous. It is noticeable that the steam machinery of our wooden vessels and ironclads have performed well, and that no accidents of a general nature have taken place, showing them to be unreliable in time of need. Had any one of the *Monitors* or the *Ironsides* become unmanageable before Fort Sumter, they would, ere this, have been resting upon the bottom of the harbor, and the fact that they performed well generally is creditable to the skill of our engine-builders. The gunboats maintain their stations on the blockading squadron and are not continually running home for repairs; and whether they attain as much speed as would be desirable or not, it is certain that thus far they have done the nation good service in time of need.

THE CONSTRUCTION OF ARMOR STEAMSHIPS.

No subject has engaged more public attention lately than the construction of armor war-vessels. Compared with such those vessels which are constructed wholly of wood are worthless, all other things being equal. But the building of armor-clad vessels is comparatively a new art respecting which much ignorance necessarily prevails even among those who have practically devoted themselves to the subject. This is the reason why so many different opinions have been propagated and so many different plans proposed for war-ships, with claims of superiority for each. The first important consideration towards arriving at correct ideas respecting the construction of the best vessels of this character is a knowledge of their requirements. An efficient armor ship should have a very strong frame; be as impenetrable to shot as it is possible to make it; be a good sea-going vessel, capable of going anywhere upon the ocean; have good accommodations for crew and supplies, and be competent to steam at a high speed. Ship-builders, engineers and sailors admit that these requirements are necessary conditions to a really efficient armor war-vessel. The merits and demerits of those iron-clads which have already been built may be judged of by considering how near they come up to, or depart from, these requirements.

Unless an iron vessel has a strong frame and is heavily plated it is nearly, if not equally, as defective as a wooden vessel. The best system of framing for an armor vessel is a question of vast importance and scientific interest. William Fairbairn, C. E., the distinguished practical and scientific engineer, has laid down the proposition that all iron vessels should be treated, with respect to strength, like hollow girders. They should be of cellular construction along the upper deck, bottom and part of the sides. An armor vessel should have sufficient strength of frame to support heavy plates, and when completed, it should be capable of being sustained on one point or between two supports, like a girder. The cellular principle of building iron ships affords the most strength with the greatest economy of material. Rigidity is one of the necessary qualifications towards securing impenetrability, and the cellular principle affords this in a high degree.

Wooden frames for iron plates are not to be recommended. In fact iron frames are the only kind suitable for screw merchant steamers or war steamers. The French frigates, which are constructed with armor plates upon wooden frames, like *La Gloire*, have not given satisfaction. The heavy plating is liable to work loose on the timber framing when the vessel labors in a heavy sea.

From the late triumphs of heavy artillery in penetrating thick armor, both with solid shot and shell, it is now held that plates of 4½ inches in thickness are required to resist 68-pound shot, moving at a velocity of 1,500 feet per second; 6½-inch plates for 130-pound shot; 7½-inch plates for 200-pound shot; 8½-inch plates for 300-pound shot; 10½-inch plates for 400-pound shot; 11½-inch plates for 500-pound shot. Armor composed of a number of these plates bolted together is not equal in power of resistance to the same thickness of solid metal, and the fastenings are more liable to break when struck with heavy shot. A greater thickness of thin plates bolted together is herefore required to obtain the same resistance. It

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is an advantage to secure the greatest resisting power with the least weight of material, as a lighter draft of water and a higher speed may thus be obtained. It is also of much importance to employ the best quality of soft iron for armor, as hard metal does not possess good resisting powers.

Differences of opinion exist as to whether broadside batteries or turret batteries are the best for war-ships. Broadside guns require ports situated at a considerable hight above the water-line; hence more plating is required for such vessels and a greater amount of hull is exposed. But they can carry a greater number of guns and there is more room to operate them with effect. They can deliver broadside after broadside in rapid succession, wheeling in short circles with the use of two screws driven by independent engines.

In relation to speed and ability to go anywhere on sea, there cannot be two opinions. These qualities are positively necessary to an efficient war-vessel. Thus far not a single fast iron-clad vessel has been built for our navy. The *Roanoke*—not yet finished—is an old wooden frigate, armor-plated. Her speed has yet to be tested; but judging from what it was before she was razeed and plated, it will not come up to the requirements of the times. The very large armor-clads—*Dictator*, *Puritan* and *Dunderberg*—now building in this port for the navy are intended to be fast and good sea-going vessels, but the latter has a combustible frame which is objectionable.

On page 265, Vol. VI (new series) of the Scientific American, after describing several different classes of vessels which were at that period being built, we said: "An iron-clad war-vessel should not only be as impentrable to shot as it is possible to make it, but it should also be a good sea-boat, possess a high speed, and be as well adapted for offense as defense." It is certainly no credit to our navy that while our merchant sailing vessels and steamers have been distinguished, all the world over, for their speed, our war steamers have been notorious for sluggishness. Of all the qualifications specified for an efficient war frigate, speed stands first on the roll. Speed is really power, and it ought to have been the very first consideration upon which our naval authorities should have acted in the construction of all our new armor-clads. They have at last awakened to a sense of its importance, and we hope that every new steamer built will have a speed of at least fourteen knots per hour. But we think they have gone to the extreme on another "tack." Several of the new armor vessels under construction, and others about to be contracted for, it is said, will be huge leviathans, and may prove to be as difficult to maneuver as the big new English frigates, which take from ten to fifteen minutes to turn around. Smaller vessels of greater speed and equal impenetrability would be more effective; they would be to huge unwieldy antagonists like sword-fish to whales.

DOUBLE-SCREW STEAMERS.

A long and interesting paper was lately read before the Society of Arts, London, on "twin-screw" steamers, by Capt. T. E. Simmonds, R. N. He advocated the employment of two screws for steamers, as being far superior to one screw, and he alluded to the American double-screw steamers as follows:—"It may be interesting as well as instructive to learn that the success of the twin-screw system is not confined to our side of the Atlantic. Numerous vessels of the navy and mercantile marine of America are now fitted on this system; in fact, those destined to act in narrow waters are considered comparatively useless without it. In a recent reliable account from America, the loss of the iron-clad ram *Indianola* is entirely attributed to her "inability to maneuver," falling an easy prey to two small gunboats having that power in a high degree. The writer states, 'Now that she has gone we see her defect plainly enough, and war has taught the lesson—she could not control her position. The two small vessels could run round her, while she could not turn; they could thus ram her first on one side, then on the other, till the mailed giant was beaten to death, while at any time one blow from her prow would have crushed both of her assailants, could she have got at them.' He further asks: 'How are we building our ocean rams? Have they the means of turning at pleasure? If not, they are likely to fall victims to smaller craft, as did the *Indianola*.' Another instance from the same quarter is that of the *John Nelson*, a twin-screw steamer, 225 feet long, used for transporting the mail trains across the Delaware river. This vessel turns end for end at every trip, in order to deliver the cars at the same end they entered, performing the maneuver in a strong current, often choked with ice, in from 1 min. 25 sec. to 1 min. 30 sec., with the utmost ease and precision. I might add numerous other instances to prove the invaluable properties of this method of propulsion, as adopted in America, did time permit. I must not, however, omit to mention that the celebrated Stevens's battery, and many gunboats now building with fixed turrets, are being fitted with twin-screws worked by separate and independent engines."

After reading the paper, Mr. Dudgeon stated that the English double-screw steamer *Flora* had a mid-ship displacement of 200 feet; her nominal horse-power was 200; indicated power 500; her consumption of fuel was 11 tuns in 24 hours; she carried 300 tuns of cargo in a draught of 9 feet, and steamed at the rate of 13 knots per hour. He defied any person to show similar results as to tunnage and horse-power with a single-screw steamer.

The employment of double screws for steamers, in preference to the use of a single screw, is becoming a question of great importance to marine engineers and naval architects. It deserves careful and general consideration. We are not aware of *numerous* vessels being now fitted with two screws for the navy and mercantile marine of America, as stated by Capt. Simmonds, but those which have been provided with double screws have given satisfaction, we believe. All vessels which are designed for rams should be capable of turning in very narrow circles, or they will not be effective. A ram 400 feet in length, with a single screw, cannot turn without it has considerable sea-room; and it may be destroyed by another ram of one-half the length, that may be turned in half the space. Large single-screw steamers take about ten minutes to move round in a great circle; and on this account they cannot be rapidly maneuvered; and they are unfitted for operating in narrow channels. This was found to be the case with the *Ironsides* in the late attack upon Fort Sumter. She was almost practically useless in that action, while the *Keokuk*, with her two screws, was the most nimble and easily managed vessel of the squadron. With two screws a steamer may be steered when her rudder is shot away, but with only a single screw the disabling of the rudder renders the vessel helpless. Another and perhaps the greatest advantage connected with the use of two screws is the ability of the vessel to secure a high speed with a light draught of water.

MAGNETIC STORMS.

No fact is more widely known than that a suspended bar of magnetized steel points in one direction, north and south; and yet the cause of this is one of the greatest mysteries of nature. Turn a suspended magnet east and west, and back its poles will come again, as if pervaded with instinct, to their normal position. A belief exists among scientific men and others that the earth acts as a great magnet, but how it has acquired magnetism and how it is distributed, and what may be the causes of its many changes are still unsolved problems in physical science. Magnetism is a force of nature, but what it is in essence we know not. The earth acts upon a suspended magnet in a peculiar manner by causing it to move in a certain direction; and it is subject to five different changes. For a period of about two hundred years the north pole moves slowly toward the West, then again it returns slowly toward its former position. It is also subject to an annual variation, a daily variation, and a variation caused by the moon; and most perplexing of all, it is subject to sudden changes of position called "magnetic storms."

The magnetic needle is like a wind vane, as it serves to render visible the direction and intensity of that mysterious force which operates through the earth. Observations upon the magnetic needle reveal the fact that it will sometimes start and oscillate with great activity, without any apparent cause; and it has been noticed that magnets in various parts of the world are always thus agitated at the same moment—those in the American observatories and those in Europe throb in unison. These disturbances of the needle have been the subject of much study by several scientific men, and it is believed that these phenomena have a connection with movements in the sun. Prof. Schuabe, of Dessau, has been watching the disc of the sun for nearly forty years, and he has recorded the groups of spots which have appeared upon it. He has found that these occur in greater number in periods of about ten years. They were noticed in 1848 and 1859, and in these two years great disturbances of the magnetic needle were observed. A remarkable lunar scene was witnessed in the latter year, on the 1st of September, by two astronomers, Messrs. Carrington & Hodgson, in England. They were independently observing the sun's disc, which at that time exhibited a large spot, when they saw a very bright ball of light suddenly break out over the spot and move with a high velocity over the sun's surface. At that moment a magnetic storm took place, and the needle was agitated as if moved by a sudden living impulse.

Magnetic storms are always accompanied by auroræ and earth magnetic currents. The latter are known to telegraph operators. They traverse the surface of the earth, and a portion of magnetism is taken up by the line-wires, seriously disturbing communications. It has been found that auroræ and great earth currents recur at intervals of about ten years, with the spots on the sun's surface. It therefore appears that magnetic disturbances occur in the sun, in the earth's atmosphere, and in the earth itself, at the same time and at regular periods. The mysterious force, "magnetism," seems to pervade the entire solar system, and perhaps the whole universe. Th next period of great magnetic disturbance will take place in 1869. In that year groups of spots will appear on the sun's disc; brilliant auroræ will be noticed in the earth's atmosphere, extending over the greater part of the globe (as in 1859, when they were seen as far south as Cuba); and the magnetic needle will be greatly disturbed by earth currents.

CRYOLITE---ALUMINUM MINERALS.

The seas of Greenland were once famous for whale fisheries, but for a number of years past those have been almost extinguished on account of the nearly total destruction of "right whales." The name of Greenland has always been associated with the idea of a country full of dreary wastes of snow. Lately, however, in consequence of one valuable mineral which it possesses, it has attracted more interest than many lands which bask under the smiles of perpetual summer. The metal aluminum, which has recently become an important article in the useful arts, can be reduced most conveniently from the mineral, cryolite, found in great abundance in Greenland, which country is now the chief source whence it is obtained. Cryolite is a fluorid of aluminum and sodium, containing fluoric acid, aluminum and soda. It exists in snow-white masses, which have rectangular cleavages, and these are remarkable for melting easily in the flame of a candle. Of all the minerals containing aluminum this metal is most easily reduced from cryolite. It is obtained by roasting the cryolite, which is thus decomposed, yielding the metal in globules, imbedded in the fused fluoride of sodium, and the latter is separated by lixivation. The first bars of aluminum produced a few years since in Paris were obtained by passing the vapor of the chloride of aluminum over sodium heated in a porcelain tube. Aluminum thus obtained was much more costly than silver, but it is now sold in Paris for less than one dollar per ounce, the cost having been reduced by improved modes of preparing it, but chiefly by the use of cryolite from "Greenland's icy mountains." In one hundred parts of cryolite there are twenty-four of aluminum.

The crystal soda that is used in the arts is obtained from common salt (chloride of soda) by decomposing the salt in iron retorts with sulphuric acid. The chlorine passes off, leaving the sulphuric acid united with the soda, forming the sulphate of soda. This product is afterward roasted with carbon and is decomposed, forming carbonate of soda or black ash, from which our common soda is derived. As cryolite contains a large quantity of soda, the manufacture of this alkali has also been commenced from the Greenland mineral at Copenhagen (Denmark) and

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four other places in Europe. The process consists in first grinding the cryolite into powder, then mixing it with ground chalk, or limestone, at the rate of one hundred parts of the former to one hundred and twenty-seven parts of the latter. These substances are calcined in a reverberatory furnace. The product is then dissolved in hot water, and a solution of alumina and soda results, the lime being precipitated. This clear solution is afterward charged with carbonic acid gas, which precipitates the alumina and unites with the soda, forming a solution of carbonate of soda, which is run off into pans and crystallized. But before being crystallized, if caustic soda is designed to be made, fresh-slaked lime is added to it, and with this the carbonic acid unites; a precipitate of the carbonate of lime falls to the bottom of the vessel, leaving the solution to be crystallized as a pure caustic soda—a substance which is now in much demand for refining petroleum. Greenland is the only country, we understand, in which cryolite has as yet been discovered.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list :—

Sewerage and Dredging Apparatus.—This apparatus, which may be termed a floating sanitary sewerage receptacle and suction dredging boat, consists of a floating vessel capable of being propelled by steam power or other means, having within it one or more deposit compartments, whose capacity is a very considerable proportion of that of the whole vessel, provision being made for buoyancy, for the reception of sewerage deposits or of muddy or other deposits, obtained from the bottoms of docks, harbors, rivers, bays or other waters, or from bars, or from a stationary collecting reservoir, which may be arranged at the outlet of a sewer and in which a partial filtration may be effected to obtain the deposits in a more condensed form, or for the collection of solid matters that may be suspended in such waters while in an agitated condition; such vessel being fitted with pumps or their equivalents, and furnished with suitable suction, delivery and discharge pipes for taking up the said deposits or solid matters, with more or less water, and delivering them into the before-mentioned compartment or compartments of the vessel, in which the said deposits or solid matters are retained, while the water is nearly all expelled through filters fitted to the vessel; the deposits so collected being intended to be conveyed away by the vessel to be discharged where it cannot be returned by the change of tide or current. The principal object of the invention is the removal of deposits which have been delivered from sewers at their outlets, but it may be used generally for the removal of heavy deposits from the bottoms of docks, rivers, bays, harbors and other waters, or the solid or decomposing matters that may be suspended in the waters thereof, and also of the sunken or floating, decomposing or putrifying organic matter found in rivers, streams, or other waters, and thereby serves not only to prevent the contamination of the atmosphere but to prevent, in a great measure, the formation of mud banks and deposits which require to be removed by digging and the filling-up of docks and under piers, and thus to prevent injury to harbors. The inventor of this improvement was William Atkinson, deceased, late of Brooklyn, N. Y. Information relating to the invention may be had of his executors, Charles Atkinson, Moline, Ill., and Joseph Atkinson, Newbury, Vt.

Gilt Molding.—Imitation gilt molding is usually manufactured by covering the molding with silver-leaf, and after the leaf has been applied the surface is burnished and covered with gold lacquer, whereby it assumes the appearance of real gold. Silver-leaf is expensive, and furthermore it takes a very long time and great care to apply the same to the molding; the leaves are small and very thin, and one leaf after the other has to be placed in position, and with the greatest care the joints between the several leaves cannot be wholly concealed. The object of this invention is to use large narrow strips of tin foil or other cheap metal foil sufficient to cover the whole length of the molding without joints, and capable of being applied by means of a roller which presses and stretches the same into and on the different members of the molding. H. W. Ladd, of New York City, is the inventor of this device.

Railroad Chair.—This invention consists in the employment of a sustaining bar which extends across two sleepers or crossties and fits into the necks of adjoining rails, and is held in place by a bed piece supported by two crossties, in such a manner that said sustaining bar receives the weight and thrust of passing trains conjointly with the top of the rails, and being supported by the underlying sleepers at the weak point, serves not only as a sustaining but as a re-acting support to keep the rails in line and in surface. E. St. John, of Elmira, N. Y., is the inventor of this improvement.

Marline Spike.—This invention consists in the arrangement of one or more cavities in the surface of a marline spike, in such a manner that when the point of the spike is passed through a rope the end of the strand can be passed through the opening before the spike is withdrawn, and thereby the operation of splicing ropes is considerably facilitated. Albin Warth, of Stapleton, N. Y., is the inventor of this device, which he has also secured by patent in Europe.

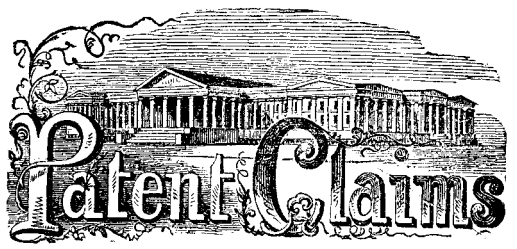
Apparatus for Heating Air by Steam.—This improvement relates to the heating of air for the supply of furnaces by means of the exhaust steam from a steam engine, and the condensation of such steam by its consequent loss of heat, to enable its water to be returned to the boiler. It consists in the employment for the above purpose, of an apparatus composed of a series of flat, vertical and parallel radiators connected at one end with a steam-box, which receives the exhaust steam from an engine, and at the other with a box for the reception of the water of condensation, and incloses within a box or casing at one end, of which there are one or more inlets for air, and at the other end of which there is a pipe connected with a fan, by which a current of air is drawn through the box between and in contact with the radiators, and, after being heated by the exhaust steam, is driven into a furnace for the purpose of accelerating combustion, thereby utilizing the waste heat of the steam, while the water obtained by condensation in the radiators is collected to be returned to the boiler by the force pump. A patent was issued for the above-described invention by Addison C. Fletcher, of New York City.

Drilling Turrets.—The object of this invention, by Thomas F. Rowland, of Greenpoint, L. I., is to drill the bolt holes or other holes in a gun turret, or other circular structure, perfectly radial to the center, and to ream out holes which have been drilled or punched in the plates previously to their being set up, and bring such holes, in lapping plates, exactly opposite to each other, and radial to the center of the structure. The invention consists principally in the employment, for the above purpose, of a machine, for drilling or reaming, attached to a shaft which is arranged concentrically to the axis of turret or structue in bearings above and below it, and which has the rotating axis of the drill or reamer stock perpendicular to the axis of the said shaft, such machine being adjustable upon the shaft lengthwise of the latter to operate upon the structure at any hight, and the shaft being capable of turning, so as to present the drill or reamer in any radial direction.

IT IS a noteworthy fact of the criminal absurdities of fashion, that when silk and cloth are the dearest and most difficult to be had, it requires more of each material to make one man or woman's garb than it did a hundred years ago.

THE ATLANTIC MONTHLY. Published by Ticknor & Fields, Boston, Mass.

The July number commences the twelfth volume of this standard periodical, and the public are assured in the prospectus that the reputation it has earned will be fully sustained. The list of contributors includes many well known names in literature and others who are earning fame and distinction through the magazine in question. The publishers say that the prosperity of the *Atlantic* enables its conductors to employ the most eminent talent of the country in its columns. All the best known writers in American literature, contributing constantly to its pages, give it the sole right to be known as our national magazine. And this assertion will be cordially re-echoed by all who wish to see the moral, esthetic and educational standard of literature elevated in this country. The contents of the June number embrace "Weak Lungs, and how to make them strong" (illustrated); "Violet-planting;" "The Hancock House and its Founder;" "Horrors of San Domingo," and other articles of interest.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MAY 19, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

38,542.—Rotary Engine.—W. B. Allyn, Washington, Ohio:

I claim, first, The stationary annular cam, A, provided with ports, i i', and situated between the cylinders, C C, in combination with sliding pistons, D, common to both cylinders and with stationary abutments, j, all constructed and operating as and for the purpose herein shown and described.

Second, The rock-shafts, f, provided with arms, e, in combination with cranks, g, links, h, and with the pistons, D, constructed and operating as and for the purpose specified.

[This invention consists in the arrangement of a stationary annular cam provided with an induction and exhaust port and situated between two rotary cylinders in combination with sliding pistons common to both cylinders and with stationary abutments in such a manner that by the steam admitted through the induction port in the cam and by its action on the sliding pistons a rotary motion is imparted to the cylinders and to the shaft to which they are attached, and that an extensive surface is offered to the action of the steam.]

38,543.—Clock.—R. T. Andrews, Plymouth Hollow, Conn.:

I claim, first, The driving-wheel, B, furnished with a series of twelve pins, e1 e2 e3, &c., which are arranged to act upon an arm of the stop shaft to bring the stop, m, or its equivalent into operation substantially as and for the purpose herein specified.

Second, The combination on the same shaft, y, of the stops, m and r, and the lifting arms, v and u, substantially as herein set forth.

Third, The combination of the driving-wheel, B, furnished with pins, e1 e2 e3, the wheels, o and k, carrying the stop pins, l and q, the two stops, m and r, and the lifting arm, u, the whole applied to operate substantially as herein specified.

[This invention consists in a certain novel construction, arrangement and combination of the parts of the striking movement whereby it is rendered simpler than the movement in common use, and less liable to get out of order.]

38,544.—Apparatus for Sewerage, &c.—William Atkinson, Brooklyn, N. Y. Ante-dated Oct. 26, 1862:

I claim an apparatus whose principle elements consist of a floating vessel having one or more compartments or any portion of its interior constructed and arranged for the reception of such deposits of solid matter or of muddy water or water containing solid matters; a pump or pumps and pipes or other equivalent means of delivering the such deposits or water into said compartments or space; one or more filters or strainers to provide for the escape of water from said vessel and the retention of the deposits or solid matters therein, and suitable means of discharging the deposits or solid matters, the whole combined to operate substantially as and for the purpose herein specified.

38,545.—Tea and Coffee Pot.—John Bamber, Rochester, N. Y.:

I claim the application of the ledge or guard plate, l, as and for the purpose set forth.

38,546.—Flour-packer.—John Beall, Berlin, Ill. Ante-dated Aug. 15, 1862:

I claim the arrangement of the compensating cone, K, with the shaft, I, platform, E, cylinder, B, and packer, D, as and for the purpose herein shown and described.

[This invention is particularly designed for packing flour and meal in sacks and barrels, direct from the mill, the object being to obtain a machine which will automatically adjust itself so as to pack with uniform closeness, and thus put equal quantities in all receptacles of the same size.]

38,547.—Stack Cover.—Jacob Bickhart, Harlan, Ind.:

I claim a cover for hay and grain stacks, composed of a cap, A, having sides, C, connected to it by hooks or hinges so constructed as to admit of the sides being readily attached to and detached from the cap, and the sides composed of one or more pieces and arranged so as to be connected together at their edges and form close joints, substantially as and for the purpose herein set forth.

I further claim the pin, B, in combination with the cap, A, and sides, C C, for the purpose herein set forth.

[The object of this invention is to obtain a cheap, substantial cover for hay and grain stacks, one which will admit of being readily applied to the stack and removed from it, and afford secure protection from rain or snow.]

38,548.—Railroad Rails.—Thomas S. Blair, Pittsburgh, Pa.:

I claim the production of a railroad rail, part of steel and part of iron, without welding by carbonizing a portion of the top of the rail, then rolling down the blisters, tempering and straightening the same, substantially in the manner and for the purpose described.

38,549.—Artificial Leg.—Douglas Bly, Rochester, N. Y. Ante-dated July 20, 1862:

I claim the improved transverse bearing, a b, constructed, arranged and combined with the foot and leg, substantially in the manner and for the purposes shown and described.

38,550.—Artificial Leg.—Douglas Bly, Rochester, N. Y.:

I claim, first, Expanding and contracting the artificial limb by means of the vertical or longitudinal over-lapping edges, c, or equivalent, in such a manner as to adapt the same to the size of the mutilated extremity of the natural limb, substantially as herein set forth.

Second, I claim the arranging or placing the axis, e, at right angles, with line of progression of the wearer, when the longitudinal diameter of the foot is at an angle, more or less, with said line.

Third, I claim the stationary axis, e, intermediate with the foot and ankle portion of an artificial leg, in combination with the groove of the ankle turning in such a manner that the motion and friction comes on the superior surface of the axis, so as to clear it of dirt, and prevent wear, substantially as herein set forth.

Fourth, In combination with the axis thus arranged, I also claim the central flange, h, or its equivalent, for retaining the parts, C e B, in their normal relations to each other.

Fifth, In combination with the axial bolt, e, and flange, h, I also claim the connecting rods, j j, or their equivalents, as herein described.

Sixth, I claim the flexible non-elastic vulcanized india-rubber tendons, substantially as described.

Seventh, I claim the constant coaptation of the wearing surface of the joint with an axial bolt, by means of yielding springs, in combination with tendons binding the parts together, in the manner set forth.

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Eighth, I claim the beveling of the groove, f, in the ankle-piece, to facilitate lateral motion of the ankle as herein described.

38,551.—Bed Bottom.—James Blythe, Lafayette, Ind.:

I claim the application and combination of the buckle, D, and the strap, C, to the band, X, the press-snap, B, and eye-screw, A, in manner as above described by and through which the bands forming the bed-gearing are attached to the bedstead, and can readily be fastened and unfastened.

38,552.—Truss Bridge.—John Boles, 2d, Boston, Mass.:

I claim the combination and arrangement of the top and bottom chords, vertical tie-rods and overlapping or overlapping and interlocking annuli as described.

I also claim the combination and arrangement of the top and bottom chords, vertical tie-rods, overlapping or overlapping and interlocking annuli and an arched beam, the whole being substantially as described and represented.

38,553.—Centrifugal Pump.—Eli Brazelton, St. Louis, Mo.:

I claim the water-lock, j k, in combination with the revolving disk, B, of a centrifugal pump, constructed and operating substantially in the manner and for the purpose herein shown and described.

Also the arrangement of the outer casing, A, and inner cylinder, D, with respect to each other so that the inner casing forms a part of the water-way being connected with the supply pipe through the outer casing as shown and described.

Also the arrangement of a vertical propeller wheel, B, having an annular opening extending all around on the periphery of the top side of the wheel for the upward or vertical discharge of the water through a water-way in the outer casing as specified.

[The object of this invention is to construct a pump capable of raising the largest volume of water possible, in proportion to the power expended and particularly applicable for a wrecking pump or for the purpose of raising sunken vessels.]

38,554.—Composition for Welding Steel.—Andrew Briggs, Lawrence, Mass. Ante-dated Aug. 8, 1862:

I claim the composition of matter consisting of the above-named ingredients, substantially as described and for the purpose set forth.

38,555.—Window Shade Fixture.—Edward T. Briggs, Salem, Mass.:

I claim the stationary-block, B, shaft, a, helical spring, e, and revolving nut, E; in combination with the screw-thread, c, shaft, a, helical spring, i, loose, revolving disk, F, and stationary nut, H; the several parts being constructed and arranged to operate in the manner and for the purpose set forth.

[This invention consists in providing the tubular or hollow curtain roller with a novel device whereby the variations in the tension of the main spring, by which the curtain is drawn up, is compensated for, and thereby the curtain maintained in any position in which it may be placed.]

38,556.—Alarm Lock.—George N. Bruster, Factoryville, N. Y.:

I claim combining an alarm lever, L, with a lock, in such a manner that it can be operated upon the key of said lock through the medium of either single or double sets of lever and sliding connections, substantially in the manner herein set forth.

I claim also arranging the rocking lever, U, and sliding arm, V, or their equivalents, in such a position relatively to the latch-bolt, F, and lock-bolt, G, of any suitable lock, as that the outward and inward movements of the lock-bolt, will respectively connect and disconnect the alarm lever with the latch-bolt.

I also claim combining with each other the several parts and movements of an alarm lock as herein-before described, when said parts or movements are formed and arranged substantially in the manner and for the purpose herein set forth.

38,557.—Percussion Cap-holder for priming Fire-arms.—Lewis Ross Budd, Oskaloosa, Iowa:

I claim a revolving cap-setter arranged and operating as herein described and for the purposes set forth.

38,558.—Animal Trap.—Alonzo Burnham, Montague, Mass.:

I claim my improved trap, having its rotary trapper, D, the chamber, C, thereof, the sweep, m, at the front of such chamber, the entrance passage or passages, l, the catch lever, n, and the auxiliary trapping chamber, B, with the throat, d, and gravitating gate or door, e, combined or arranged, and made in manner and so to operate substantially as herein before specified.

38,559.—Filter and Cooler combined.—James E. Cheny, Rochester, N. Y.:

I claim a reservoir, open at the top and extending through the packing, having in combination therewith the fan, C, the pan cover, D, the outer cover, E, and the air space intermediate between the said covers, all as and for the purposes shown and described.

38,560.—Apparatus for distilling Pine Wood, &c.—Seth L. Cole, Burlington, Vt.:

I claim the above-described apparatus, as described and set forth in the drawings and specifications, for extracting the oil or spirits of turpentine directly from wood by means of a furnace arranged and combined with a retort, a gas receiver, refrigerator and condensers; a distilling or refining apparatus and skeleton cylinder or iron basket, in which the wood is placed and conveyed into the retort. The several parts of said apparatus I claim and use, in combination with each other, for the purpose of extracting oil or spirits of turpentine directly from wood, and saving the residuum or tar, from the same, in the manner and as set forth and represented in the drawings hereto attached, and substantially as described in the above specifications.

Second, I claim the retort with the open cone-shaped bottom constructed and operating as herein set forth and described.

38,561.—Gas Regulator.—Robert Cornelius, Philadelphia, Pa.:

I claim the employment in gas regulators of a thin mica disk or plate which operates by its elasticity to regulate the passage of gas.

38,562.—Lighting Gas by Electricity.—Robert Cornelius, Philadelphia, Pa.:

I claim, first, The combination of the cylindrical or bell-shaped metallic piece, A, the cylindrical or bell-shaped hard rubber piece, C, and the fur or woolen lining of the metallic piece arranged and operating as above described.

Second, The employment of a combination of silk and fur to form a lining to this metallic piece, C.

Third, The combination of the metallic bell-shaped or cylindrical piece, A, the bell-shaped or cylindrical hard rubber or non-conducting piece, C, and the metallic foil or its equivalent within the same, and the fur or woolen lining of the metallic piece, A.

Fourth, The connection of the metallic bell, A, with the pedestal, D, at the outer circumference of the pedestal.

38,563.—Lighting Gas by Electricity.—Robert Cornelius, Philadelphia, Pa.:

I claim, first, A double electrophorus substantially as above described for lighting gas and other inflammable materials.

Second, I claim an air-tight electrophorus constructed and operating substantially as above.

Third, I claim the metallic tube with the interior sliding piece, substantially as above described.

Fourth, The non-conducting piece, B, for uniting the metallic tubes, A and A′,

38,564.—Apparatus for clipping Bolts and Rivets.—Zephaniah B. Cotant, Greenwich Station, Ohio:

I claim in combination with the jaws, B and E, the stirrup, H, and screw, K, for the purpose set forth.

I also claim the general construction and arrangement of devices described forming the improved bolt and rivet clippers or cutters.

38,565.—Machine for finishing Metallic Surfaces.—George Cowing, Seneca Falls, N. Y.:

I claim the series of joints and pulleys, as described, in combination with a swivel or swivels, substantially as and for the purposes herein set forth.

38,566.—Screw Propeller.—William Joseph Curtis, Tufnell Park Road, Holloway, England:

I claim the arrangement of the compound joint within the hollow boss of the propeller, substantially as herein shown and described.

[The object of this invention is to render the propelling screw of a steam ship available in combination with the rudder or even without a rudder for steering such vessels. Hitherto the difficulty of carrying out this object has been insuperable from the necessity for providing such a connection between the propeller and its driving shaft as would resist the great strain to which it must be exposed. The invention consists in mounting the propeller on the extremity of the driving shaft in such a manner that it will be free to move with the rudder without its power of rotation being in any way interfered with.]

58,567.—Wick Tube for Lamp Burners.—Celadon L. Daboll, New London, Conn.:

I claim the form and manner of constructing the tube for lamp burners for kerosene and other oils and fluids, as substantially set forth in the above and foregoing specification.

38,568.—Iron Street Crossing.—Lionel Tobert d'Epineuil, Paris, France, and James M. Letts, Washington, D. C.:

We claim the construction of street crossings combining for the purpose, the ditch, D D, and the grooved and perforated metal plates, p p p, in the manner and for the purpose herein described.

38,569.—Coal Screen.—Richard B. Douty, Shamokin, Pa.:

I claim as an improved article of manufacture a screen having its bars, A, of taper form longitudinally or in the direction of their length as herein set forth.

[This invention consists in constructing the bars of the screen of tapered form, the bars gradually diminishing in width from the upper to the lower end of the screen, and the spaces between the bars of course gradually increasing in width, whereby the screen is effectually prevented from choking or clogging.]

38,570.—Machine for driving Piles.—John Du Bois, Williamsport, Pa. Ante-dated May 13, 1863:

I claim the double conical-shaped socket and head to protect and guide the pile while being driven in the manner and for the purpose specified.

Also the arrangement, mode of securing and operating the socket punch, E, for driving piles below the surface, substantially in the manner as herein set forth.

38,571.—Metal-plated Shoes for Carriages.—John Du Bois, Williamsport, Pa. Ante-dated May 15, 1863:

I claim the flanges, b b, and their fastenings, clamps, c c, and keys, e e, when combined with a broad runner, and constructed to operate substantially as described, and for the purposes set forth.

38,572.—Window Sash-fastener.—Jacob Ely, Manheim, Pa.:

I claim the arrangement and construction of the oblong plate, A, with its flanges or brackets, a a and b b, attached flat-spring, E, in combination with the bolt, B, made and held by a pivot between, b b, having either a straight arm, C, or elbowed arm, C C, with a thumb-plate, D, and operated by a flat spring, E, resting on the arm, C, in the manner and for the purposes specified.

38,573.—Safe.—John Farrel, New York City:

I claim the method of rendering safes, chests, or vault doors, burglar-proof by plates or blocks composed of alternate strips or bits of hard and soft metal, arranged substantially as herein described, so as to resist the action of drills or other cutting instruments, on the principle herein specified.

38,574.—Roll for Ladies' Hair.—John Edwards, New York City:

I claim a hair roll tapering towards its ends and having a wire or its equivalent within substantially as described.

[The object of this invention is an improvement in that class of rolls which are worn by ladies at the back of the head to give an increased swell and fullness to the hair.]

38,575.—Bier.—Daniel Fitzgerald, New York City:

I claim, first, The combination of the two side windlasses, placed opposite, sustaining at each end one strap, C, and geared to move with perfect equality, so that the coffin may not turn over but be lowered safely into the grave, in the manner substantially as above described.

Second, Disengaging the two cross straps, at one side, by unfastening them and drawing them up on the other side by continued turning of the crank, in the manner described.

Third, The adjustable pulleys, F, on the shaft, adapting the bier to a long or a short coffin, constructed substantially as above described.

38,576.—Shears for clipping Horses.—Samuel H. Folsom, East Cambridge, Mass.:

I claim the shears in combination with back and guide, B, and comb, d, which are made to operate substantially in the manner specified.

38,577.—Apparatus for drawing Soda-water.—William Gee, New York City:

I claim a valve, B, and parts, A D E F, and opening, C, in combination with valve, H, and its parts; forming a double soda-water valve, for the purpose herein described.

38,578.—Cattle Pump.—John B. Ghormley, Bellefontaine, Ohio:

I claim the combination and arrangement of the vibrating or swinging platform, C, troughs, F F′, pump, H, pipe or spout, q, and conducting spouts, r r′, substantially as herein described and for the purpose specified.

38,579.—Fixture for Window Curtains.—John Gibbs, Brooklyn, N. Y. Ante-dated March 18, 1862:

I claim the combination of the fixed plate, 1, slide 2, carrying the pulley, and detent 4, extending through the slide, 2, into or against the plate, 1, the whole being constructed and operating substantially as herein-above set forth.

38,580.—Machine for heating Untempered Clay for Bricks and Tiles.—Isaac Gregg, Pittsburgh, Pa. Ante-dated April 9, 1862:

I claim the heating of crude or untempered clay, preparatory to its being pressed into bricks, tiles or other articles made of clay, by means of an apparatus, A, consisting of a cylindrical box, a, and spiral, b, or their equivalents, constructed and operated as described, substantially as and for the purpose herein set forth.

38,581.—Plow.—Lowre Green, Great Bend, Pa.:

I claim, first, The brace-rod, b, cast solid on the extension head or main frame, G, and having its opposite end provided with a dove-tail to fit into the socket, S′, on the inside of the mold-board, D, as and for the purposes set forth.

Second, The coulter, J, provided with the slot, O, and bolt, V, in its upper end, and the lugs, d, near its lower end, for receiving and holding the point of the share, S, when used in combination with said share, S.

Third, The arrangement and combination of the extension head or main frame, A, moldboard, D, share, S, coulter, J″, lugs, d, brace-rod, b, and slot, S′, as and for the purposes set forth.

38,582.—Composition for Pavements, &c.—Peter Harder, Danville, Pa.:

I claim the composition for pavements substantially as herein set forth.

38,583.—Ventilating Top-piece for Tents.—James Higgins, 59th Regiment Illinois Volunteers:

I claim the cylinder or pipe, in combination with the flanges, socket staples, tenons and sockets and hoop, for the support and ventilation of and a flue for stove-pipes and tents, substantially as set forth in the specifications.

38,584.—Locomotive Boiler.—George F. Johnson, Philadelphia, Pa.:

I claim a jet or jets of steam introduced into the combustion chamber of a coal-burning locomotive boiler at the rear of the said chamber, when the jet or jets are directed toward the fire-box, as set forth, for the purposes specified.

38,585.—Metal Box.—John L. Kite, Philadelphia, Pa.:

I claim connecting together the ends of a metal strip, A, by a tongue, b, formed at one end of the strip, into a staple-like projection, d, formed on the opposite end of the strip, substantially as and for the purpose herein set forth.

38,586.—Ladder.—Ernest I. Knowlton, Lyons, Mich.:

I claim, first, The adjustable single-footed standard, a, pins, r, braces, b, and pin, d, in connection with the front part, i i, substantially as and for the purposes described.

Second, The table, h, with the cleats, j and n, and furcated legs, k, substantially as and for the purposes described.

Third, I claim the variations made by the two top rounds, d and m, both fitting loosely in the sides, i i, and the second, m, being placed about one inch one side of the line of the remaining rounds.

Fourth, I claim a joint in the center of the ladder formed by the adjustability of the two upper rounds of lower part, d and m, and the lapping of the notch, f, at the lower end of the extending part, a, on to the third round, g.

38,587.—Churn.—H. R. Ladd, Orwell, Ohio:

I claim the shaft, D, sleeve, G, arms, J, and bars, K, when used in combination with the beaters, L and M, these several parts being constructed, arranged and operated as and for the purpose set forth.

38,588.—Manufacture of Imitation Gilt Molding.—Hermon W. Ladd, New York City:

I claim the method herein described of producing foil-covered moldings, which method consists in having each sheet or piece of foil made to cover the entire face of the molding; then pressing and stretching the foil upon the molding, and then pressing the foil with quicksilver, all in the manner herein described.

38,589.—Dyeing and printing a Black Color on Fabrics with Aniline Compounds.—John Lightfoot, Accrington, England:

I claim the use of certain metallic salts, or their oxides, as herein stated, either alone or combined with chlorate of potash, and then mixed with a salt or salts of aniline, or any analogous homologous, or isomeric compounds, either singly or mixed together, as well as the process or series of processes, as previously described, for the production of a black dye or stain.

38,590.—Machine for boring and mortising Blind Stiles.—E. R. Longhead, Cincinnati, Ohio. Ante-dated Dec. 11, 1861:

I claim, first, Forming by machinery oblique mortises in blind stiles, &c., by the conjoint operation of a boring bit and a rotating cutting tool, substantially as specified.

Second, I claim communicating to the boring bit, G, a horizontal reciprocating motion in connection with an oblique vertical motion, by means of the reciprocating guide frame, H′, and guides, H, in the manner substantially as specified, for the purpose of boring a double row of holes, as set forth.

38,591.—Skate.—Curtis O. Luce, Brandon, Vt.:

I claim, first, The recesses, d d, in the upper surface of the plate, C, in combination with the strap-holes, c, and spurs, e, substantially as and for the purposes herein specified.

Second, The heel-strap, H, and heel-plate, F, when used in connection with the adjustable plate, C, and the straps, E E′, for the purpose herein specified.

[This invention consists in the employment of an adjustable foot-piece attached to the front part of the runner of the skate, and arranged in such a manner that it will, when the skate is in use, yield or give to the ball and front part of the foot, and thereby promote the ease and comfort of the wearer or skater. The invention further consists in an improvement in the strap attachment, whereby the skate is firmly secured to the foot, and in such a manner as not to inconvenience the wearer or skater.]

38,592.—Sewing Machine.—William A. Mack, Seville Ohio:

I claim, first, The universal joint formed by the union of the arms, J and K, with the socket, L, these several parts being constructed, arranged and operated as and for the purpose specified.

Second, I claim the shuttle, N, in combination with the curved shuttle race, M, having an angular trough when both the shuttle are constructed, arranged and operated substantially as set forth.

Third, I claim the arm, P′, gripe, P, spring, R, and wheel, O′, when these parts are constructed, arranged and operated, substantially as and for the purposes specified.

38,593.—Cultivator.—Isaac B. Mahon, Marion, Ohio:

I claim the construction and arrangement of the bars, A A and B, placed vertically edgewise, and welded together at their front ends, and braced by a thin cross-bar C, placed vertically edgewise, in combination with the forked handle braces, G G, each formed in one piece, in the manner and for the purposes herein specified.

38,594.—Escapement.—William N. Manning, Rockport, Mass. Ante-dated Feb. 28, 1862:

I claim the employment of the obliquely-notched disks, C C, in combination with each other and with the balance-wheel staff, b, and escape-wheel, A, in the manner and for the purpose herein shown and described.

[This invention relates to that class of escapement in which the escape-wheel gives impulse to the balance without the intervention of a lever. Its novelty consists in an improved system of pallets attached to and oscillating with a balance staff arranged perpendicularly to the axis of the escape-wheel just beyond the circle described by the points of the teeth of the said wheel, but within the planes of revolution of the said teeth, by which system and arrangement some important advantages are obtained.]

38,595.—Patient Elevator.—Ernst Marx, New York City:

I claim, first, A patient elevator consisting of a rising and falling frame, A, with head-piece, E, and foot-piece, D, standards, C, endless screw, g, worm wheel, f, and adjustable straps, F, all combined and operating in the manner shown and described.

Second, The toothed, sectional arc, l*, and pinion, l′, in combination with the head-piece, E, and frame, A, constructed and operating in the manner and for the purposes specified.

Third, The employment or use of the strap carrier, G, in combination with the removable straps, F, and elevating frame, A, constructed and operating substantially as and for the purpose described.

[This invention consists in the arrangement of a rising and falling frame suspended or supported so that it can be adjusted over a bed at any hight and raised and lowered at pleasure, in combination with removable straps in such a manner that, by bringing said frame over the bed of a sick person, and on a level with the surfaces of said bed and pushing the straps through under the body of the patient at such points where it is desirable to support said body, the patient can be elevated from his bed in a convenient position and removed, so that the bed can be cleaned and kept in order without danger to the health or comfort of the patient.]

38,596.—Harvester.—J. B. McCormick, St. Louis, Mo.:

I claim, first, A reel for harvesters provided with one or more sliding rake-heads, E, operated substantially as shown, or in any equivalent way, in combination with a curved or concave platform, C, endless apron, H, and binder's platform, S, as and for the purpose specified.

Second, The fixed, inclined bars, r, placed over the apron, H, the teeth, o, on said apron, in combination with the binder's platform, J, arranged as and for the purpose set forth.

[This invention relates to a new and improved raking and carrying or discharging device to be applied to grain harvesters, whereby the cut grain may be delivered to the binders, who are on the machine, and bind the gavels as they are presented to them. The object of the invention is to obtain a labor-saving attachment for harvesters, which will materially reduce the cost of harvesting grain.]

38,597.—Carriage Hold-back.—Rufus Nutting, Randolph Vt.:

I claim, first, The adjustable hold-back, A I K F and H, or its equivalent, in combination with the spring, B, or its equivalent, for thills or shafts, for the use of one-horse teams, or poles for two-horse teams, substantially as described.

Second, The chafe plate, D, or its equivalent, in combination with the hold-back, A I K F and H, substantially as described and for the purposes set forth.

38,598.—Carpet Nail or Tack.—William P. Patton, Harrisburgh, Pa:

I claim the construction of carpet tacks of sheet metal, substantially as the manner herein set forth and described.

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38,599.—Press.—Israel Peck, Southold, N. Y., and William H. H. Glover, New York City :

We claim, first, The combination of rotating boxes, constructed substantially as and for the purposes set forth, with a press and trough, as above specified.

Second, We also claim the employment of the boxes, c, as above described, having a bottom constructed and used as set forth, and with double sides, the interior being perforated, all as herein made known.

38,600.—Stopper for Fruit Jars.—Treat T. Prosser, Fond du Lac, Wis., assignor to Atterbury, Reddick & Co., Birmingham, Pa :

I claim, first, The two uniform, elastic metallic disks, flanges, a a, and shoulders, s s, in combination with the quadrangular elastic ring, r, the whole operated by the nut, c, and screw, b, substantially as set forth.

Second, The stopple, as above described, and claimed in combination with a jar, can or other vessel having a slightly conical or flaring mouth, as set forth.

38,601.—Carriage Cover.—James I. Rankin, Astoria, N. Y. Ante-dated April 2, 1863 :

I claim the suspended cover constructed substantially as described and provided with cords and pulleys, all arranged to operate as and for the purpose herein set forth.

[The object of this invention is to obtain a cover to protect carriages from dust, &c., while in carriage-houses; one which may be readily raised above the carriage and folded down over it by a single person, and without danger of injuring or marring the carriage.]

38,602.—Oil Still.—Jacob Reese, Pittsburgh, Pa. :

I claim the use of partition fire-walls in still furnaces, each having a gutter or air-flue in its upper surface, so situate in relation to the still that the seams or joints of the still shall be situate over the gutter or flue, while the wall on either side of the gutter is in close contact with the surface of the still, in the manner and for the purposes hereinbefore described.

Also the use, in combination with the guttered fire-walls enclosing the joints of the still, of air flues, for the purpose of passing a current of cool air along and over so much of the joint and rivets of stills as are situate in that part of the still which is situate within the fire-chamber of the furnace, and thereby preventing the opening of the joints, and carrying off any oil which may leak from the still.

Also the use of two or more goose-necks in a single still where the still is so constructed as that a separate vapor space is formed for each goose-neck, while the fluid distillate is allowed to pass freely between the compartments thus formed.

Also the use, in stills, of partitions extending below the lowest level of the fluid to be distilled, so as to separate the vapor in each compartment from that in the adjoining compartments, and afford a free passage between the compartments of the fluid to be distilled; for the purpose of allowing of the use of two or more goose-necks or vapor pipes in one still, substantially as described.

38,603.—Mill Pick.—George M. Rhoades, East Hamilton, N. Y.—Ante-dated Dec. 14, 1862 :

I claim the above-described mill pick as a new article of manufacture, said pick being provided with the tapering sectional head, the nipple and rings, and the arms for the shield, constructed, adjustable and used in the manner and for the purposes specified.

38,604.—Self-loading Fire-arm.—Wayne H. Rice, Windsor, Conn. :

I claim the arrangement or combination of the lever guard, D, with its extended arm, i, detent, d, dog, e, with the slide, C, substantially in the manner as and for the purposes described.

38,605.—Drilling Bolt-holes in Turrets of Gunboats.—Thomas F. Rowland, Greenpoint, N. Y. :

I claim, first, The employment, for drilling or reaming holes in the turrets of war vessels or in other circular structures radial to the center thereof, of a drilling or reaming machine secured to and adjusted on a shaft, which is arranged centrally within the turret or structure with the axis of the drill or tool stock perpendicular to the axis of said shaft, substantially as herein described.

Second, The driving of the drill or tool stock of a machine so applied upon a central shaft within a turret, or other circular structure, by means of an engine attached directly to the framing of the machine, substantially as herein specified.

Third, The arrangement of the so-applied engine upon the frame of the machine, on the opposite side of the shaft to that on which the drill or tool stock is applied, for the purpose of balancing the frame upon the shaft, substantially as herein set forth.

38,606.—Hydraulic Press.—Christopher E. Rynnes, Charlestown, Mass. :

I claim the arrangement or combination of the screw, b, and nut, c, with the hydraulic press cylinder, F, piston, G, and platen, A, substantially in the manner and so as to operate therewith as hereinbefore specified.

38,607.—Method of molding Bricks.—O. W. Seely, of Syracuse, N. Y. :

I claim the above-described method of perforating the bricks made of dry clay, and expelling the air therefrom at the instant the final pressure is applied, by means substantially as described.

38,608.—Crank Motion.—Thomas Shaw, Philadelphia, Pa. :

I claim the combination of metallic springs, E, with crank, B, and arm, C, in the manner and for the purpose herein set forth.

38,609.—Window-sash Fastener.—Benjamin D. Skidmore, New York City :

I claim the combination of the slide bolt, D, spring, D′, lever, E, and pendent rod, F, all arranged in connection with the case, C, and nosing, e, to operate as and for the purpose set forth.

38,610.—Cut-off and Regulator Valve.—Robert Stewart, Elmira, N. Y. :

I claim, first, The arm, e, composed of spring, l, and pin, f, and this arm, thus constructed, in combination with a cut-off valve.

Second, The lever, j, and dog, g, operating as described, and these also in combination with each other, for the purposes set forth.

Third, The combination of the arm (as described in claim first) and the lever, j, and dog, g (as claimed in claim second), operating substantially in the manner and for the purposes hereinbefore specified.

38,611.—Cut-off Valve Gear.—Robert Stewart, Elmira, N. Y. :

I claim, first, The pin, G, working in sleeve, F, in combination with the crank, C, in the manner and for the purposes set forth.

Second, The dog, e, and guards, o o, in combination with lever, I, constructed and operating substantially as set forth.

38,612.—Railroad Chair.—E. St. John, Elmira, N. Y. :

I claim the employment of the sustaining bar, B, extending over two cross-ties, D, and supported by the bed-piece, C, in combination with rails, A A′, constructed and operating as and for the purpose shown and described.

38,613.—Smoothing Iron.—Jerome L. Tarbox, Wyoming, Pa. :

I claim the handle, B, in combination with a revolving smoothing iron and the casing, J, when arranged to operate as herein described and for the purposes set forth.

38,614.—Grain-dryer.—Edward Trenholm, Washington, D. C. :

I claim the combination of the fan, B, or other substantially equivalent means of producing a forced current of air; the detachable branched conductors, C C′; the perforated mouth, D E or F, and the stop-cocks or valves, G H, when the said parts are constructed and arranged, and operate as herein described, to deliver forced currents of air in any required volume into any required parts of a body of grain, or other substance, and admit of ready separation and removal to facilitate the insertion and removal of grain.

[By this apparatus forced currents of air are supplied in any amount to such parts of the grain as may be found to require drying, cooling or ventilation.]

38,615.—India-rubber Sole for Boots and Shoes.—Theodore C. Weeks, Boston, Mass. :

I claim, in the manufacture of india-rubber soles for boots and shoes that have tacks imbedded in them, by which they are fastened to the upper, first passing the tacks through a metallic tack-head holder, and vulcanizing the tack-holder and the tacks embedded in the rubber, with the points of the tacks protruding therefrom, substantially as described.

38,616.—Forming and double-seaming Stove Boilers.—Horace B. Whitlock and Charles E. Toan, Plymouth, Ind. :

We claim the above-described machine for the uses and purposes above specified, except the right-and-left extension screw, and we claim the application of the same, or its equivalent, for the uses and purposes above specified.

38,617.—Cap for Fruit Jars, &c.—N. P. Whittelsey, West Meridan, Conn. :

I claim a cap for sealing fruit cans, &c., having a flat top, slightly tapering sides and corrugated flange edge, substantially as described.

38,618.—Draw-spring for Railroad Cars.—R. A. Wilder, Cressona, Pa. :

I claim the combination of the wooden spring, a, and draw-bar, b b, constructed and operating substantially as described.

38,619.—Foot-rest.—Erastus Wilkins, Warner, N. H. :

I claim, first, The arrangement of a shaft, a, with one or two pinions, b, gearing in toothed racks, c, in combination with the cushion, A, of a foot lounge, constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, Making the cushion, A, of a foot lounge adjustable in a vertical and self-adjusting in a horizonal direction as and for the purpose specified.

[The object of this invention is a foot-lounge which can be readily adjusted to suit the convenience of the person using the same. The invention consists in securing the cushion of a foot lounge to a shaft each end of which carries a pinion, which gears in a vertical-toothed rack in such a manner that the cushion, on being rotated, is raised or lowered according to the direction in which the rotary motion takes place, and thereby the position of the cushion can be regulated to suit the convenience of the person intending to use it, and furthermore, by the pinions and racks the cushion is firmly supported and not allowed to sink or slide down spontaneously, and at the same time it adjusts itself to any angle, according to the position of the foot or feet resting on it.]

38,620.—Lamp for Railway Cars.—T. S. Williams and P. S. Page, Boston, Mass. :

We claim, in combination with a lamp or lamp fountain, O, a case or socket, A, provided with the springs, B, and an oil receptacle or drip-chamber at its lower end, as and for the purpose specified.

We further claim, in connection with the spring, B, and drip chamber, the projections, c, arranged as shown, to support the lamp or fountain, and still admit the waste oil or overflow to pass into the drip chamber, as herein described.

[The object of this invention is to obtain a lamp for railway cars, steamboats, &c., which will prevent the escape or overflow of oil, which may be readily removed for the purpose of cleaning, filling, &c., and which will be firmly retained in position while in use.]

38,621.—Vice.—Peter Wright, Dudley, England. Patented in England, Sept. 25, 1862 :

I claim the combination of the slide box, A, the T-shaped bar and sides or jaws, with the box, F, when constructed, arranged and operated as described.

38,622.—Revolving Railway Pilot.—Elias and Arcalous Wyckoff, Elmira, N. Y. :

We claim the vertically-revolving pilot rollers, D D, driven from the truck wheels, B B, of the locomotive, or in an equivalent manner, and having their axes placed at such an angle that they can be thrown out of gear by a single forward movement of their contiguous journals, substantially as herein set forth.

We also claim the cam-toothed gear, k l, by which the pilot rollers may be thrown in or out of gear by an easy rolling motion, when at the highest speed, without the liability of stripping the teeth, substantially as herein specified.

We also claim, in combination with the sliding support, C, the set screw, G, with its shoulder, u, the gage slot, s, and lever, H, arranged substantially as described.

38,623.—Slide Valve for Steam Engines.—George W. Bollen (assignor to himself and Michael Madden), St. Louis, Mo. Ante-dated Jan. 26, 1862 :

I claim the combination of a valve and checks arranged as described with a valve seat formed by the plate, a, in the manner and for the purpose specified.

38,624.—Tobacco Press.—John Briggs (assignor to J. J. Hair), Louisville, Ky. :

I claim the skeleton hoops, E E′, formed with welded eyes, e e′, and connected by rods, F F′, in combination with the box, A A′ A″, and casing, C C′, constructed in the manner and for the purposes herein described.

Second, The hooks, G G, or other substantially equivalent adjustable and readily detachable fastening employed to connect the ends of the hoops, E E′, at any required distance asunder.

By this invention a curb is produced capable of resisting the heaviest pressure used in compressing tobacco and adapted to be readily opened for the removal of the finished article.]

38,625.—Milk Rack.—Robert Cruikshank (assignor to himself, Daniel B. Cole and W. H. Archibald), Salem, N. Y. :

I claim the inclined strips A A, connected by cross strips, a a, and having the ends of horizontal slots, B, fitted in them, and all arranged as herein shown and described, to form a new and improved milk rack.

38,626.—Harvester.—Pearson Embree (assignor to himself and Jonathan Speakman), West Chester, Pa. :

I claim the inclined platform, W, and endless apron, G, combined with and arranged on a harvester, for turning the severed stalks and laying the same in swaths on the ground, substantially in the manner described.

38,627.—Corn Planter.—R. R. Fenner (assignor to himself and W. H. Patton), Paxton, Ill. :

I claim operating the seed-discharging wheels, J, by means of the arms, L, attached to the shafts, K, of the wheels, the adjustable stops, r r, and slide bar, O, as set forth.

Also the part pinion, X, sliding pinion, U, on the shaft, T, the crank, t, and pitman, Y, when all are arranged specifically, as shown, for operating the slide bar, O.

[This invention relates to an improved seed-planting device of that class which are designed for planting seed either in hills or drills. The invention consists in an improved means for discharging the seed from the seed-boxes and depositing the same in the hills or drills. The invention also consists in the means employed for operating the seed-distributing device ; and, further, in a means for graduating the depth of penetration of the shares to regulate the depth of the planting of the seed as may be desired.]

38,628.—Lamp Chimney-adjuster.—J. R. Fogg (assignor to Samuel Adlam, Jr.), Portland, Maine :

I claim, first, The application to a lamp of a thin elastic strip of metal adapted to guide the cone or chimney to one side of the vertical axis of the lamp and to support the chimney in an elevated position, substantially as described.

Second, Combining with the base of a removable deflector a thin strip of spring metal arranged in the relation to the vertical wick tube, d, substantially as described.

38,629.—Brick Machine.—Isaac Gregg, Philadelphia, Pa., and Henry Moser, Pittsburgh, Pa., assignors to Isaac Gregg, aforesaid :

We claim, first, The employment of the parallel A-grooves, a′ a′, along in the underside of the mold frame, A, in combination with the correspondingly-beveled supporting wheels, B. B and counter-pressure wheels, c c, the same being arranged to operate together, substantially in the manner described and set forth for the purposes specified.

Second, We claim giving to the pistons, D, of the molds a positive downward motion by means of the flanges, d′, or their equivalents, on their stems, in combination with the two retaining plates, e′ e′, on the lifter, E, and the hook, a″, on the frame, A, substantially as described for the purpose specified.

Third, We claim, in combination with the mold frame, A, and pistons, D, operating as described, arranging the molds therein so that their narrower sides shall form their mouths for receiving the clay, and the action of the pistons, D, be directly upon the lower side edges only of the bricks, in pushing the latter out of the molds, as described and set forth for the purposes specified.

Fourth, We claim, in combination with the sweep, F, the oil box, f5, and the lubricating roller or brush, f4, the same being constructed and arranged to operate together, substantially in the manner described and set forth, for the purposes specified.

Fifth, We claim operating the lubricating sweep, F, in the manner described, by means of the cam, G, the same being connected together by means of the vibrating lever, H, or its equivalent, and arranged substantially as set forth.

Sixth, We also claim the employment of the sliding box, K, for the crank wrist-pin, in combination therewith and with the connecting rods, L L, and lever, L′, arranged in relation to the crank, I, cam wheel, G, and mold frame, A, in the manner described, and for the purpose specified.

38,630.—Oat Separator.—Lewis Patric (assignor to himself and Henry Reed), Victor, N. Y. Ante-dated March 25, 1863 :

I claim the employment of the double perforated cylinders, D and E, constructed and arranged substantially in the manner herein specified, for the purpose of separating oats from wheat, as set forth.

38,631.—Clothes-dryer.—W. P. Patton (assignor to himself and H. A. Boyle), Harrisburg, Pa. :

I claim the combination and arrangement of the rail, A, bracket, B, the fingers, a, washers, b, and studs, e, substantially as and for the purpose specified.

38,632.—Hat Brush.—C. F. Phelps (assignor to himself and Elisha Stone), Boston, Mass. :

I claim the improved brush, or combination of the brush and the spring holder, or its equivalent, the latter being for the purpose specified.

38,633.—Bit or Boring Tool.—Burton Sanderson (assignor to E. C. Morrill & Co.), Derby Line, Vt. :

I claim my improved boring tool, as made, not only in the tapering form described, and with its smaller end of a concavo-convex shape, but with its cutting edge extending entirely around the part, A, in manner as set forth.

38,634.—Marline Spike.—Albin Warth, Stapleton, N. Y., assignor to himself and W. A. Lilliendahl, New York City :

I claim the arrangement of one or more cavities, a, in the surface of a marline spike, constructed and operating substantially as and for the purpose herein shown and described.

38,635.—Churn.—J. H. Weaver, Chillicothe, Ohio, and D. M. Mefford, Jeffersonville, Ind. Ante-dated Jan. 31, 1862 :

We claim the volute spring, C, when constructed of flat metal of suitable kind, and when arranged around the dash rod, so as to form with the stop, d, a cup to prevent the escape of cream, as well as to assist in raising the dasher, substantially as set forth.

38,636.—Stove.—A. C. Williams (assignor to Shear & Packard), Albany, N. Y. :

I claim the arrangement of a hollow grate placed and fitted to the stove, as described, in combination with the glazed window or door, substantially as described, in and for the purposes set forth.

The employment of a guard plate made either as a part of, or independent of, the ordinary grate, in combination with the vertical hollow grate and the glazed window, the subject matter of the first claim, substantially as described and for the purposes set forth.

38,637.—Method of heating Air by Exhaust Steam.—A. C. Fletcher, New York City :

I claim the employment for the heating of air for the supply of a furnace and the condensation of exhaust steam for the return of its water of condensation to a steam boiler, of an apparatus composed of a series of flat vertical and parallel radiators, A, combined with steam and water boxes, C D, a casing, B, and a blower, H, the whole being arranged as herein specified.

38,638.—Breech-loading Ordnance.—John Lee, Bolivar, Ohio :

I claim the breech-pin, A, constructed and operated substantially as described, in combination with the segmental pinion, D, and rack-rammer, C, for the purposes set forth.

38,639.—Stocking Supporter.—Ellen F. Putnam, New York City :

I claim the stocking supporter composed of the waist belt, a, tapes or straps, b b, and elastic straps, c c, extending down the sides of the person and taking the tops of the stockings, as and for the purposes specified.

38,640.—Paint Oil.—Adolph Millochau, New York City, assignor to himself and Alfred Berney, Jersey City, N. J. :

I claim, as a new product, or article of manufacture, the paint oil, of a character substantially as described, produced from the acid residuum remaining after the purification of petroleum or coal oil, or other bituminous oils, in the manner set forth.

38,641.—Process of preparing Oil as a Substitute for Linseed Oil.—Adolph Millochau, New York City, assignor to himself and Alfred Berney, Jersey City, N. J. :

I claim the combination of these two methods, the whole together constituting a new and useful process for making a fine, clear and limpid paint oil, from the acid residuum remaining after purification of petroleum, coal oil, or other bituminous oils, substantially as described.

38,642.—Car Spring.—Richard Vose, New York City, assignor to the Metallic Car-spring Company :

I claim a compound spring formed of a helical or spiral coil of elastic metal imbedded in a mass of elastic india rubber or gutta-percha, substantially in the manner and for the purpose herein set forth.

38,643.—Breech-loading Fire-arm.—Samuel Strong, Washington, D. C. :

I claim, first, the combination of the solid plug with the hinged breech piece, the centrally-placed stationary nipple and a mechanism for removing the plug, substantially in the manner described, for the purpose of converting the breech-loading into a muzzle-loading fire-arm.

Second, I claim the lever, I, pivoted to the solid portion of the breech piece and vibrated by the trigger when the hinged breech piece is thrown back to remove the cartridge cup or plug, substantially as described.

38,644.—Breech-loading Fire-arm.—Samuel Strong, Washington, D. C. :

I claim, first, The cartridge catch, F, Fig. 5, with its lateral spring, c, operating and arranged in combination with a recoil block, E, and a flanged metallic cartridge, substantially in the manner and for the purpose herein set forth.

Second, I claim the arrangement and combination of a vibrating lever, P, or its equivalent, with the recoil block, E, and hammer, H, of a breech-loading gun, substantially in the manner and for the purposes herein set forth.

Third, I claim the arrangement and combination with each other of the cartidge retractor, F, with its lateral spring, c, recoil block, E, annular catch, G, vibrating lever, P, breech piece, A, and hammer, H, of my improved breech-loading fire-arm, as herein described, for the purpose herein set forth.

RE-ISSUES.

1,473.—Low-water Detector for Steam Boilers.—C. H. Brown, Fitchburgh, Mass. :

I claim a combination consisting not only of an expansion tube, its valve seat and valve, and a whistle or its equivalent, but a mechanism or apparatus so arranged and combined therewith as to produce, during the expansion of such tube, and while the valve seat is being moved in one direction by such expansion, a counter or opposite movement of the valve, substantially as specified.

And I also claim the combination of the expansion pipe, B, the lever, H, and the rod, F, in their application to or combination with the tube, A, the valve-seat, valve and whistle thereof, as arranged and applied together, substantially as specified.

And furthermore, I claim the arrangement of the pipes, A B, the valve, f, the valve seat, a, the whistle, W, the lever, H, and the rod, P, and also their arrangement and combination with an air vessel, F as described.

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1,474.—Machine for chiming and jointing Staves.—D. R. Bowker and W. P. Bensel, New York City. Patented Feb. 12, 1861 :

We claim, first, The swinging clamp frame, J, in combination with the rotating cutter disk, C, arranged substantially as shown, for the purpose of jointing the staves, as set forth.

Second, The combination of the rotating cutter disk, C, with the cutter heads, G G, and swinging clamp frame, J, arranged for joint operation, substantially as and for the purpose set forth.

1,475.—Diamond Protector.—John Dickinson, Brooklyn, N. Y. Patented Sept. 3, 1861 :

I claim, first, The stem, B, having a ledge or stop, c, in its side, in combination with a diamond stem-holder or stock, A, having a ledge, D, or other equivalent device, for uniting the motion of the stem, substantially as hereinbefore set forth.

Second, I also claim the combination of the tension spring, F, applied as hereinbefore set forth, in combination with the stem, B, and protector stock, A, for the purposes hereinbefore set forth.

Third, I also claim the combination of the gages, H, or equivalent device for supporting the diamond-holder on a single or double straight edge rule, with the diamond-holder, substantially as hereinbefore set forth.

Fourth, I also claim the combination of a double straight-edge guide rule, with the gages, H, and diamond-protector stock, substantially as hereinbefore described and for the purposes set forth.

1,476.—Lime Kiln.—Richard Donaldson, Mount Nebo, Pa Patented Feb. 19, 1861 :

I claim, first, The cooler, F, beneath the kiln, communicating therewith and exposed to the air, all substantially as described.

Second, In combination with the said cooler, I claim the beveled blades, L, so arranged and operating as to support the lime within the said cooler, and to permit the lime to fall therefrom, substantially as described.

Third, The tray-like lid, G, when hung to the cooler and arranged for closing the same, substantially as specified.

Fourth, Making that part of the interior of the kiln beneath the flues of the funnel-form, and illustrated and described for the purpose specified.

Fifth, Combining with a lime kiln, substantially as described, a chimney surmounted with a damper, T, or its equivalent, for the purpose specified.

1,477.—Stoppering Jars, Cans, &c.—J. F. Griffin (assignee of W. D. Ludlow), New York City. Patented Aug. 6, 1861 :

First, I claim the employment, in combination with a jar having lugs, b b, of a clamping device which has its inclined or cam surfaces, a a, located on each side of a crossbar, C, bearing upon the cover of the jar, the whole constructed to operate substantially as set forth.

Second, I claim, in combination with a clamping device which forces the lid down on to its seat by the operation of inclined or cam surfaces, a device for effecting a yielding or elastic pressure upon the lid of the jar, substantially as and for the purposes described.

Third, I claim so forming the lid or cover, B, and so arranging a packing ring, d, with it as that the packing will be retained in connection with the lid, substantially as hereinbefore described.

1,478.—Stove.—D. G. Littlefield, Albany, N. Y. Patented Jan. 24, 1854. Re-issued Nov. 19, 1861; again re-issued Aug. 26, 1862 :

I claim the combination of the fire-pot, E, having vertical openings, C C, with the supplying cylinder, F, when the same are immersed within the outer cylinder, M, which forms the chamber, G and G', substantially as and for the purpose herein described.

1,479.—Stove.—D. G. Littlefield, Albany, N. Y. Patented Jan. 24, 1854. Re-issued Nov. 19, 1861; again re-issued Aug. 26, 1862 :

I claim combining with a supplying cylinder for reserve coal, a fire pot having vertical openings, C C, extending up from near the grate to the closed sides or portions of the same, as high as it is desirable to ignite the coal, substantially as and for the purpose described.

1,480.—Preparing a Paint Oil.—Adolph Millochau, New York City, assignor to himself and Alfred Berney, Jersey City, N. J. Patented March 17, 1863 :

I claim making paint oil of a character substantially as described, from petroleum or coal oil, or other bituminous oils, substantially in the manner set forth.

DESIGN.

1,761.—Link of an Ornamental Chain.—E. S. Richards, Attleboro', Mass.

EXTENSION.

Packing Rotary Pumps.—Caroline Cary, Brockport, N. Y., administratrix of A. W. Cary, deceased. Patented May 15, 1849 :

I claim the pistons packed as described, and with small orifices in the pistons to allow steam, water, &c., to be admitted, as described, under or inside of the packing where the engine is in operation, for the purpose set forth.

Notes and Queries

W. T. F., of Conn.—Chromium is a metal, but it is very difficult of reduction from its native oxide, hence it is very rare. The bichromate of potash is the most common salt of the metal chromium. It is of a deep orange color, and is employed for dyeing woolen and cotton fabrics, and paper impregnated with it possesses photographic properties. The chromate of lead is used as a yellow pigment.

C. W. C., of Pa.—You speak correctly when you say that there is an enormous pressure on the slide-valve, but you argue sophistically when you assert that the slide-valve in the open air has no material pressure on its seat, and that the steam has no pressure on the valve except what is due to the area of the ports. That means nothing. You must be aware that the exhaust of a steam engine carries off not only the vapor admitted to the cylinder but also any portion of air that was in the same, producing a partial vacuum. If a slide-valve in the open air was entirely exhausted so that no unbalanced atmospheric pressure resisted it below, the fifteen pounds of common air on every square inch of the valve would be just as apparent as if it were fifteen pounds of steam. You can illustrate this by taking two "face-plates," such as you must have in your works, and putting them together; if they are of considerable size and well made, you will find the atmospheric pressure quite apparent if you try to lift one from the other. The Magdeburg hemispheres illustrate this principle. You can find a description of them in any work on philosophy. Wherever steam touches a slide-valve it exerts its force; if the steam all comes on the top of the valve, then the same is unbalanced; but if this valve is so made that the force of the steam is equalized, it is balanced and will move as easily as if it were in the open air.

J. O., of Pa.—We suppose that the practice of placing pails of water in a newly-painted room arose from the supposition that they would absorb the fumes arising from the paint. Water does possess this quality in a certain degree, but it would require many more pails of water than could be got into a sleeping room conveniently, to insure the health of the occupant thereof.

J. W., of Ill.—We do not know the precise temperature at which *paper maché* is dried, and the only guide that we can give you is to heat the articles as high as you can safely without blistering the coat of shellac varnish previously applied. For black grounds drop ivory black is used, mixed with a dark-colored varnish; for others, ordinary painter's colors ground with linseed oil and mixed with varnish. To japan, apply six or eight coats of the black grounds and thoroughly dry each coat before adding another, afterward polish with rotten stone and sweet oil, and produce a brilliant surface by hard rubbing.

P. J. M., of N. Y.—You had better order from the Commissioner of Patents a copy of the fire-alarm telegraph patent. We cannot tell you what it will cost. We published the engraving of this invention, some years ago, in the Scientific American.

M. C., of Conn.—We do not advise you to delay your application for the reasons set forth. By delay you are liable to be brought into interference with some other applicant; this would involve you in expenses of litigation and much delay, which by promptness might be avoided.

J. B., of Mich.—Your chisels break because they are too hard; let the temper down slightly and you will succeed better.

P. W., of N. Y.—We have seen many substitutes for the crank of a steam engine but they all failed signally. Yours may possess novelty of a desirable nature, but we cannot express an opinion without a better drawing than the one you have sent us.

R. E. T., of N. J.—We do not regard propelling small vessels by ejecting a column of water from the stern below the load line as either practical or economical. The plan is as old as the hills.

C. W. S., of Pa.—You will find the old-fashioned belt lace as reliable as any other arrangement for the purpose.

F. L. K., of Wis.—Any coppersmith will make you a distilling apparatus of any size you desire. The apparatuses in question are not made, except to order.

M. M., of Vt.—We would advise you to use the frictional gearing, by all means, instead of the toothed wheels. Wheels intended to run together should be cast from the same metal. You can obtain any desired amount of friction by regulating the angle of the grooves and the depth of the same.

L. C. McP., of Ohio.—We have never tried or heard of others having tried soapstone powder for lubricating shafts, &c., and we are extremely skeptical as to its possessing any value for the purpose.

T. M., of Pa.—Lignum-vitæ, boiled in oil and set so that the shaft will run on the end of the grain, will answer admirably for your machine.

L. B. M., of Minn.—We cannot insert your article at present, neither can we publish it at all in its original form. We do not allow any uncivil or captious remarks to appear in the Scientific American, respecting inventions illustrated therein.

P. L. S., of Pa.—A cheap, convenient and effective air engine for propelling cars on city railroads, would be an advantage over steam. But, judging from the nature of air compared with steam, you will find it impossible to make an air engine sufficiently compact to propel a car successfully. Any marble-cutter will inform you how to make the cement for repairing the broken tombstones. A very good cement for this purpose is made with lead and marble dust, mixed with oil. A mixture of fresh-slaked lime and marble dust, made into a paste with water, makes a beautiful white cement also.

H. W., of N. Y.—For a set of cards, consisting of three carding machines, in a woolen factory 240 spindles are employed. In a cotton factory forty spindles are allowed for each loom.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, May 20, to Wednesday, May 27, 1863 :—

A & S., of N. Y., $12; A. C., of Cal., $30; H. K., of N. Y., $25; J. H. S., of N. Y., $30; H. H., of N. Y., $45; J. & D. S., of Wis., $20; L. B., of Wis., $45; J. S. U., of N. Y., $15; T. H. A., of N. Y., $25; S. N. T., of N. Y., $20; G. B., of N. Y., $16; T. E., of R. I., $20; J. A & J. W. M., of Ind., $16; N. J., of N. Y., $16; T. S., of Ill., $26; C. D., of O., $29; C. W., of Mass., $16; A. M. H., of Cal., $16; E. B., of Mass., $16; D. P. P., of Cal., $15; L. O. B., of Ind., $27; C. E. R., of Mass., $16; H. A., of Pa., $15; W. P., of N. Y., $25; G. H. R., of N. Y., $50; S. T. H., of N. Y., $25; N. Z. P., of Ill., $20; W. P. M., of N. Y., $45; J. F., of Mass., $10; F. W. H., of Canada, $46; L. S., of Prussia, $49; A. W. J., of N. Y., $45; G. G. H., of Ill., $20; J. F. J. G., of N. Y., $20; W. P. H., of Conn., $337; G. W. L., of N. J., $50; S. M. B., of N. Y., $25; O. A. H., of N. Y., $25; C. T. B., of N. J., $20; N. H., of N. Y., $16; J. R. B., of Ind., $20; E. & W., of Conn., $44; F. A. De M., of N. Y., $40; W. A. L., of Canada, $26; W. H. F., of N. Y., $16; G. S. P., of Ala., $15; C. M., of Mass., $16; P. J., of France, $16; J. S. A., of Mass., $15; S. H. M., of Ill., $35; D. M. J., of Cal., $10; J. C., of Ohio, $29; D. S. F., of Pa., $17; McD., of N. Y., $35; C. H. P., of R. I., $10; G. W. H., of Iowa, $25; B. A. H., of N. Y. $10; R. B. M., of Ohio, $16; G. H. F., of N. Y., $12; S. P., of Mass., $16.; S. A. and W. H. P., of N. Y., $16; H. H. J., of Conn., $16; W. F., of Mass., $14; A. and F., of Wis., $25; L. W. T., of N. Y., $22; J. N. P., of Ind., $50; J. W. T., of Vt., $16; W. J. T., Jr., of N. Y., $16; S. D. L., of Mass., $16.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, May 20, to Wednesday, May 27, 1863:—

I. W. L., of Mich.; A. and S., of N. Y.; W. P., of N. Y.; T. R. T., of N. Y.; G. W. L., of N. J. (2 cases); A. C., of Cal.; G. H. R., of N. Y., S. M. B., of N. Y.; H. K., of N. Y.; T. T. H., of N. Y.; J. H. L. T., of Ill.; W. F., of Mass.; A. M. H., of Cal.; G. W. H., of Iowa.; L. O. B., of Ind.; J. C. McD., of N. Y.; J. P. Jr., of Cal.; G. H. F., of N. Y.; O. A. H., of N. Y.; T. S., of Ill.; J. C., of Ohio; C. D., of Ohio; F. and B., of R. I.; E. and W., of Conn.

Binding the "Scientific American."

It is important that all works of refference should be well bound. The Scientific American being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we shall commence on the expiration of this present volume to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style will be 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, 37 Park Row, New York.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to compute the amount they must send in when they wish advertisements inserted, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

HUBBARD BROTHERS, IMPORTERS OF WATCHES. New York, have the pleasure of announcing to their numerous friends and patrons in the army that they are prepared to fill orders and transmit parcels by mail, with the utmost care and promptitude. Watches so forwarded are registered; we take upon ourselves all risks of transportation, and guarantee a safe delivery. Just received by European steamers several large importations of that deservingly popular novelty, the Railway Timekeeper, with heavy sterling silver cases, especially adapted for army sales. *Frank Leslie's Illustrated Newspaper* of Feb. 21, 1863, says: "Hubbard's Timekeepers are becoming proverbial for their accuracy and reliability. They are particularly valuable for officers in the army and travelers." The *Army and Navy Gazette*, of Philadelphia, in its number of May 9, reviewing this watch, says: "We are pleased to see that the importations of the Hubbard Brothers is meeting the enormous sale that such an extraordinary enterprise as theirs so richly merits. These watches are novelties produced by no other House, far exceeding other manufactures in point of accuracy and elegance. Fidelity and promptness to their patrons render the House a desirable medium for traders in the army." The Railway Timekeeper has heavy solid sterling silver cases, beautiful white enamel dial, handsome gold hands, with superior regulated movement, warranted to run and keep excellent time! Price, per case of half dozen, $54, by mail, $1 65 additional for postage. Should retail readily at from $20 to $50 each. Not sold in quantities of less than six. Also the celebrated Magic Time Observer, the perfection of mechanism; being a Hunting or Open-face or Lady's or Gentleman's Watch combined, with the Patent Self-winding Improvement. The N. Y. *Illustrated News*, in its issue of Jan. 10, 1863, on page 147, voluntarily, says: "We have been shown a most pleasing novelty, of which the Hubbard Brothers, of New York, are the sole importers. It is called the Magic Time Observer, and is a Hunting and Open-face Watch combined. One of the prettiest, most convenient, and decidedly the best and cheapest timepiece for general and reliable use ever offered. It has within it and connected with its machinery its own winding attachment, rendering a key entirely unnecessary. The cases of this Watch are composed of two metals, the outer one being fine 16 carat gold. It has the improved ruby action lever movement, and is warranted an accurate timepiece." Price, superbly engraved, per case of half dozen, $204. Sample Watches, in neat morocco boxes, for those proposing to buy at wholesale, $35. It sent by mail the postage is 36 cents. Terms, Cash! required in Advance in all instances! Remittances may be made in United States money, or draft, payable to our order, if sent by express or mail, in a registered letter, at our risk. No circular or agents. ☞ Watches for the army can only be forwarded by mail. Address HUBBARD BROTHERS, Sole Importers, No. 65 Nassau street, New York. 1

Provost Marshal General's Office,
Washington, D. C., May 22, 1863.

ALL MEN WHO DESIRE TO JOIN ANY PARTICULAR Regiment of Cavalry now in the field, are hereby authorized to present themselves at any time during the next thirty days to the Board of Enrolment in their respective Districts The Board shall examine them, and determine upon their fitness for the Service, and if found to be fit, the Provost Marshal of the District shall give them transportation tickets to the general Rendezvous, at the Headquarters of the A. A. Provost Marshal General of the State. As soon as they present themselves at this general Rendezvous they shall be duly mustered by a mustering and disbursing officer, and paid by him the bounty allowed by law. JAMES B. FRY,
23 4 Provost Marshal General.

COMBINED HAND-TRUCK AND BAG-HOLDER.—IT should be in every mill, warehouse and barn. Price only $5. One truck, and patent for a county, $30. A township and a truck, $10. Patent for all the States except Pennsylvania for sale. Circulars free. J. R. Hoffer, Mount Joy, Pa. 23 4*

WORTHY THE NOTICE OF LARGE MANUFACTURERS, either in America or Europe. I can produce a cheap, permanent and beautiful black dye that answers for cotton, silk and woolen goods, simple and easy. It is patentable, and to be sold. Apply (if by letter, enclose stamp) to M. A. BERK, 17 State street, Newark, N. J. 23 4*

MACHINERY MADE BY CONTRACT OR DAYS Work, better and cheaper at 107 East 22d street, New York than at any other place. 1*

STEAM FIRE-ENGINES.—NOTICE IS HEREBY GIVEN that the trial of Steam Fire-engines, hitherto advertised for the 1st of June has been postponed to the 1st of July, 1863. Persons desiring further information will please to communicate with the Honorable Secretary of the Steam Fire-engine Committee, 68 Watling street, London, England. 1*

FOR WOOD LATHES, SCROLL SAWS, SAW BENCHES and wood-working machinery, address J. A. FAY & CO., or E. C. TAINTER, succeeding partner, Worcester, Mass. 23 & 26—3 & 6 Vol. 9 *

THE "KING MICROSCOPE"—DOUBLE LENS.—Prof. Horsford, of Harvard University, says: "It works very well, and you have got it up very neatly."—65 cents. The "S. WOODWARD," 38 cents; and the "BOWEN" microscopes, 28 cents. One each of the three kinds for $1. All free of postage. T. EDWIN KING, Evans' Hall, No. 3 Tremont Row, Boston, Mass. 23 4*

STEAM AND WATER GAGES, GLASS TUBES, PATent Gage Cocks, Whistles and Engine Counters for sale. Also indicators for ascertaining the working horse power of steam engines, heat gages and signal gongs for steamboats. E. BROWN, 311 Walnut street, Philadelphia. 1*

$40 PER MONTH AND EXPENSES. FOR PARTICULARS address (with stamp) HARRIS BROTHERS Boston, Mass. 23 tf

IMPORTANT TO THOSE USING STEAM BOILERS.—Blake's Patent Self-regulating Apparatus for supplying boilers with water. It keeps the water at a uniform hight against any pressure. Very simple and sure. All interested can see them in operation at our works, or circulars describing them will be sent by mail. BLAKE & WHEELOCK, 71 Gold street, New York. State rights sale. 23 8*

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A TREATISE ON CHEMISTRY APPLIED TO THE Manufacture of Soap and Candles; being a thorough exposition, in all their minutiæ, of the principles and practice of the trade, based upon the most recent discoveries in science and art. By Campbell Morfit, late Professor of Analytical and Applied Chemistry in the University of Maryland. A new and improved edition, illustrated with 260 engravings on wood. Complete in 1 vol. large 8vo. Price $6.

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PLATINA! ALL SHAPES! FOR ALL PURPOSES. Imported by SUTTON & RAYNOR, 748 Broadway, New York. 23 2*

GENERAL ORDERS, NO. 105.

WAR DEPARTMENT,
ADJUTANT GENERAL'S OFFICE,
WASHINGTON, April 28, 1863.

The organization of an Invalid Corps is hereby authorized.

This Corps shall consist of Companies, and, if it shall hereafter be thought best, of Battalions.

The Companies shall be made up from the following sources, viz.:

First, By taking those officers and enlisted men of commands now in the field (whether actually present or temporarily absent) who, from wounds received in action or disease contracted in the line of duty, are unfit for field service, but are still capable of effective garrison duty, or such other light duty as may be required of an Invalid Corps. Regimental Commanders shall at once make out, from information received from their Medical and Company Officers, and and from their own knowledge, rolls (according to the Form furnished) of the names of all the officers and enlisted men under their commands who fulfill the following conditions, viz.:

1. That they are unfit for active field service on account of wounds or disease contracted in the line of duty: this fact being certified by a Medical Officer in the service, after personal examination.

2. That they are fit for garrison duty; this fact being likewise certified by the Medical Officer, as above, after personal examination.

3. That they are, in the opinion of their Commanding Officers, meritorious and deserving.

These rolls shall be certified by the Examining Surgeon and Regimental Commander, and transmitted, through the regular channels of military correspondence, to the Provost Marshal General of the United States.

The Regimental Commander shall enter in the column of remarks, opposite each officer's name on the roll, a statement as to the general character of the officer for intelligence, industry, sobriety and attention to duty; and all intermediate Commanders shall endorse thereon such facts as they may possess in the case, or, if they have none, they shall state how far they are willing to endorse the opinion of the officer or officers making the recommendation. Similar rolls shall be forwarded from time to time, whenever the number of men fulfilling the conditions enumerated or the exigencies of the service may render it expedient.

Second, By taking those officers and enlisted men still in the service and borne on the rolls, but who are absent from duty, in Hospitals or Convalescent Camps, or are otherwise under the control of Medical Officers. In these cases the Medical Officer in attendance shall prepare the rolls according to Form, entering the names of officers and men from the same Regiment on a roll by themselves, and send them, with the certificate of the Surgeon, duly signed, to the proper Regimental Commander, who will forward them, as heretofore specified, subject to the same conditions and requirements. If, in any case, the Regimental Commander shall think an officer unfit, in point of character to continue in the service of the Invalid Corps, though disabled and certified by the Surgeon, he will state his objection in the column of remarks, and note the exception before signing the certificate. If any officer or enlisted man now in the service, but absent and beyond the reach of a Medical Officer in charge of a Hospital or Convalescent Camp, desires to enter this Corps, he will take the course indicated below for those who have been honorably discharged from the service.

Third, By accepting those officers and enlisted men who have been honorably discharged on account of wounds or disease contracted in the line of duty, and who desire to re-enter the service. In the case of an officer, application for appointment must be made to the Provost Marshal General of the United States through the officer detailed as Acting Assistant Provost Marshal General of the State. No application of this kind will be considered unless the following conditions are completely fulfilled:—

1. That the applicant produce the certificate of the Surgeon of the Board of Enrollment for the District in which he resides, that he is unfit for active field duty an account of wounds or disease, and is not liable to draft, but is fit for garrison duty.

2 That he furnish evidence of an honorable discharge on account of wounds or disability contracted in the line of duty.

3. That he produce recommendations from the Regimental, Brigade and Division Commanders under whom he formerly served, that he is worthy of being thus provided for and capable of returning adequate service to the Government. In case it shall be impracticable to get this last evidence, he may, having established the first two points above, satisfy the Board of Enrollment that he is deserving, and present its certificate of the fact. This evidence must all be obtained by the applicant, and must be transmitted with his application for appointment.

If there be no Acting Assistant Provost Marshal General for the State, the application may be forwarded through the Adjutant General of the State, who is desired to endorse thereon such facts in the military history of the applicant as he may know, or as are afforded by his records, and forward the same to the Provost Marshal General of the United States. Enlisted men, honorably discharged on account of disability, desiring to re-enlist in this Corps, will present themselves to the Board of Enrollment for the District in which they reside, for examination by the Surgeon thereof, who shall examine them and report the result to the Board of Enrollment.

Te Board shall then consider each case, and if the applicant is found to fulfill the conditions specified below, the Board shall give him a certificate to that effect, viz.:

1. That he is unfit for service in the field.
2. That he is fit for garrison duty.
3. That he is meritorious and deserving.
4. That he was honorably discharged from the service.

The Provost Marshal for the District shall then send the application, with this certificate of the Board, to the Acting Assistant Provost Marshal General of the State, who shall procure such evidence of service and character as the records of the Company to which he belonged, on file at the Headquarters of the State, may show, and if satisfied that it is a meritorious case, and that the man is deserving, he will enlist him in accordance with such special rules as the Provost Marshal General may establish.

Medical Inspectors, Surgeons in charge of Hospitals, Military Commanders, and all others having authority to discharge, under existing laws and regulations, are forbidden to grant discharges to any men under their control who my be fit for service in the Invalid Corps.

☞ The Provost Marshal General is charged with the execution of this order, and the troops organized under it will be under the control of his Bureau.

By order of the Secretary of War:

E. D. TOWNSEND,
21 4 Assistant Adjutant General.

A VALUABLE WORK FOR INVENTORS, PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-issues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them—Importance of the Specification—Who are entitled to Patents—What will prevent the Granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

It has been the design of the publishers to not only furnish, in convenient form for preservation, a synopsis of the PATENT LAW and PRACTICE, but also to answer a great variety of questions which have been put to them from time to time during their practice of upwards of *seventeen years*, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of six cents in postage stamps.

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In case a bid is accepted, the party making the same will be notified as soon as practicable. If within ten days the party shall fail to make payment, in Government funds, to the undersigned, the iron for which such bid was made will be subject to sale to any other person.

The right to reject any and all bids is expressly reserved. All bids must be sealed and directed to the undersigned at Washington, D.C., and endorsed "Bid for Railroad Iron." Bids will be received, as above invited, until June 5th, at which time a decision will be given.

21 3 H. L. ROBINSON, Captain and A. Q. M.

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INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receiveorders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

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TO PHOTOGRAPHERS.—IMPROVED PHOTOGRAHIC Camera, Patented March 25, 1862, by A. B. WILSON (Patentee of the Wheeler and Wilson Sewing Machine), adapted to all photographic work; such as Landscapes, Stereoscopic Views, Carte Visites, Ambrotypes, &c. Can be used by amateurs and others from printed directions. Send for a circular. Address A. B. WILSON, Waterbury, Conn. 16tf

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Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

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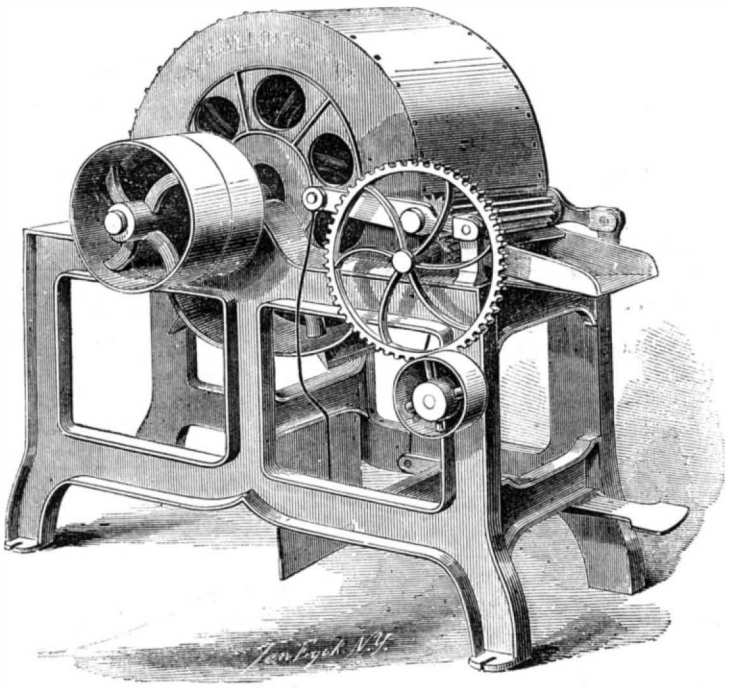
Improved Fiber-cleaning Machine.

The *Agave Americana* or Sisal hemp, as it is more generally termed in this country, is a plant which grows with great luxuriance in Central America and other countries lying between the tropics. It is a source of immense wealth, but an insuperable obstacle to the full development of its good qualities has always existed in a lack of proper machinery to prepare it for working. Various unsuccessful attempts have been made to overcome the difficulties peculiar to working the plant in question, and it is only quite recently that one effort has been crowned with success. Mr. Eduardo Juanes y Patrullo, a Spanish gentleman residing in Yucatan, conceived an idea in relation to this branch of manufacture and has succeeded, after innumerable experiments, in overcoming the obstacles which hitherto baffled other inventors, and several machines, on his plan, are now working in Yucatan, with the most excellent results. They clean, by the aid of steam power, from 350 to 400 pounds of fiber in about twelve hours, either long or short threads, without incurring, we are told, any unnecessary waste. When driven by horse-power it will clean from 200 to 250 pounds under the same conditions. Our engraving illustrates this machine, and the following description will give an idea of its operation :—



PATRULLO'S PATENT FIBER MILL.

The large drum has a pulley enclosed in it; this pulley has a number of steel combs bolted to its face (seen below through one of the spaces in the frame). This drum and its attachments are driven by the pulley on the same shaft (seen in the foreground). The small fluted rolls, at the entrance or opening of the casing surrounding the drum, are placed there for the purpose of feeding the leaves to the combs within; these rolls are driven by the large spur wheel on one end of them These are essentially the main points. The operation is as follows :—

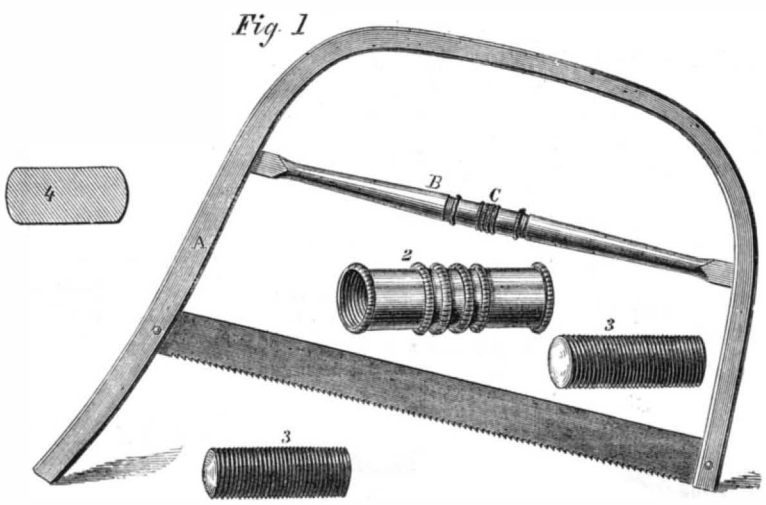
The point of the leaf is inserted in between the rolls which feed it slowly up to the combs, as these revolve with great rapidity they tear away the vegetable matter and leave the fiber free and unincumbered by extraneous substances. When half the leaf has been acted on in this way, it is reversed and the other end put through the same process; suitable means are adopted for getting rid of the refuse, and this feature is one of great importance, as the machine would soon be clogged up and have its efficiency materially impaired were this point overlooked. As the mill is now constructed we are assured that no annoyance of the kind is experienced.

The peculiar shape of the teeth and their relation to the work to be done exert the best influence on it, and the results are all that could be desired. The fibers are perfectly cleansed and yet uninjured, and, as we have before remarked, no objections can be made to the machines or to their adoption for the use intended. The scarcity of cotton and of machinery for working fibrous substances has raised the price of the staple just alluded to, to exorbitant sums. In this machine, the inventor says, all the elements necessary to breaking or preparing our northern fibers are combined, and the principles on which it is constructed can be as favorably developed in a small machine as in those of larger dimensions.

This machine is the subject of three patents, the latest one bearing the date of April 23, 1863, and is the invention of Eduardo Juanes y Patrullo, of Yucatan, C. A. Further information may be obtained by addressing him at No. 20 Lispenard street, this city.

Improved Mode of Straining Saws.

Our engraving represents an improved method of stretching saw blades, and of constructing the frame in which they are set in a cheap and durable manner. The frame, A, is in one piece; it is bent to the desired conformation and is fitted with a brace, B. This brace has a nut, C, in the center which is furnished with a right-and-left thread. When the nut is turned the frame is sprung apart and the saw blade extended. The engraving explains itself very fully and the detached pieces are details of the fixtures, the uses of which are apparent to all—Fig. 2 being the nut in an enlarged form, Fig. 3 the screws which work in it, and Fig. 4 a section of the saw frame. This is a very simple and efficient device, and will accomplish the desired end very fully, it obviates the use of cords, sticks, wires or any other appliances of a like nature.



ROBERT'S PATENT SAW FRAME.

The patent for this invention was procured through the Scientific American Patent Agency, on April 28, 1863, by Thomas D. Roberts, Utica, N. Y., and further information may be obtained by addressing him at that place.

Electrotyping Ships' Bottoms, Bolts, &c.

A proposition has been laid before the Admiralty by Mr. Walenn, a London chemist, to coat iron of any size, from a ship's bottom itself as one whole to a single bolt for the armor-plate (extent of material or shape being no objection), with a deposit of metal, such as brass or any other alloy, as thin or as thick in substance as may be wished, with a bright, hard, enamelled surface. This would supply what is chiefly wanted—the means of preventing the oxidation of ships' armor and bolts, and the fouling of iron ships' bottoms. Mr. Walenn has been directed to inspect the existing arrangements of baths and batteries now adopted at Portsmouth, and to send in to the Admiralty a special report, with accompanying estimates of his proposed plan of electrotyping.

PROSPECTUS

OF THE

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The publishers of this popular and cheap illustrated newspaper beg to announce that on the third day of January, 1863, a new volume commenced. The journal is still issued in the same form and size as heretofore, and it is the aim of the publishers to render the contents of each successive number more attractive and useful than any of its predecessors.

The SCIENTIFIC AMERICAN is devoted to the interests of Popular Science, the Mechanic Arts, Manufactures, Inventions, Agriculture, Commerce, and the Industrial pursuits generally, and is valuable and instructive not only in the Workshop and Manufactory, but also in the Household, the Library and the Reading Room.

The SCIENTIFIC AMERICAN has the reputation, at home and abroad, of being the best weekly journal devoted to mechanical and industrial pursuits now published; and the proprietors are determined to keep up the reputation they have earned during the eighteen years they have been connected with its publication.

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No person engaged in any of the mechanical pursuits should think of doing without the SCIENTIFIC AMERICAN. It costs but six cents per week; every number contains from six to ten engravings of new machines and inventions which cannot be found in any other publication. It is an established rule of the publishers to insert none but *original* engravings, and those of the first class in the art, drawn and engraved by experienced artists, under their own supervision, expressly for this paper.

Chemists, Architects, Millwrights and Farmers!

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